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PRELIMINARY REPORT AND PLANS

CROSSTOWN FREEWAY

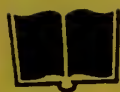
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VIEW OF CENTRAL PORTION OF FREEWAY

PRELIMINARY REPORT AND PLANS

CROSSTOWN FREEWAY

SAN FRANCISCO, CALIFORNIA

FEBRUARY 1958

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February 24, 1958

Mr. Sherman P. Duckel
Director of Public Works
City and County of San Francisco
City Hall
San Francisco 2, California

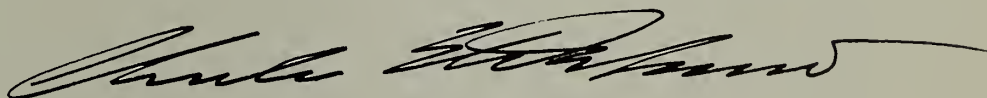
Dear Mr. Duckel:

In accordance with our agreement dated February 23, 1955, we are pleased to submit herewith our preliminary report and plans for the Crosstown Freeway.

Our work on this interesting assignment has been facilitated materially by the splendid cooperation which we have received from the affected groups, and we wish to acknowledge their valuable assistance in the formulation of the plan.

Very truly yours,

DE LEUW, CATHER & COMPANY

A handwritten signature in dark ink, appearing to read "Charles E. De Leuw", with a long, sweeping horizontal flourish extending to the right.

Charles E. De Leuw

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L I S T O F P L A T E S

Frontispiece View of Central Portion of Freeway

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SUMMARY OF REPORT AND RECOMMENDATIONS

The steady growth of population and traffic in the City and County of San Francisco and in the adjoining metropolitan area indicates the desirability of accelerating the development of adequate trafficways and other transportation facilities within the City. The particular project under consideration, the Crosstown Freeway, is one element of the "Trafficways Plan" of the Transportation Section of the Master Plan. This freeway connects the Southern Freeway and the proposed Western Freeway on a route through Glen Park Canyon, along Woodside Avenue, and through Laguna Honda ravine.

Although all freeways heretofore constructed in San Francisco have been financed and built by the State Division of Highways or by toll bridge agencies, the Crosstown Freeway is not a state route and accordingly will be planned and constructed by the City and County of San Francisco.

The preparation of this report was authorized by a contract between the Director of Public Works and De Leuw, Cather & Company, dated February 23, 1955.

The purpose of this report is to present for review by the Department of Public Works of the City and County of San Francisco, a plan showing the recommended location, alignment and grades, design features, rights-of-way required, street modifications, and utility relocations for the Crosstown Freeway, together with preliminary estimates of cost. The report includes typical sections prepared in accordance with the design standards and criteria agreed to by the city engineering staff and De Leuw, Cather & Company.

This report has been prepared under the general direction of the Director of Public Works and the City Engineer of the City and County of San Francisco. Planning has been closely coordinated with that of District IV, State Division of Highways.

The proposed freeway is designed to accommodate the traffic demands estimated for 1980. It is anticipated that the Crosstown Freeway may carry as many as 48,000 vehicles per day along the most heavily-traveled portions by the year 1980, assuming completion of the entire San Francisco freeway network.

Exploratory test borings along the route of the freeway were obtained under the direction of Mr. Hyde Forbes, Consulting Engineering Geologist. The geologic conditions are generally favorable for the construction of the recommended freeway facility, and no unusual problems are anticipated.

The recommended alignment is dictated almost entirely by topographic features, which necessitate a location along the bottom of a ravine north of Portola Drive, and on the side slope of a canyon south of Portola Drive. The route selected has the best grades obtainable. The freeway starts at an elevation of about 340 feet at its northern end, rises on a 4.47% grade (maximum) to an elevation of about 530 feet, and descends on a uniform 5.14% grade to an elevation of about 95 feet at the southern end.

An 1100-foot tunnel passing under Portola Drive preserves the existing character of the area. Another feature of the project is an elevated viaduct, approximately 0.6 mile in length, parallel to Bosworth Street near the southerly end of the project.

The project can be built in usable stages over a period of years, if funds are not available for the construction of the entire facility at once.

At its northerly end, this freeway will connect with the Western Freeway, as indicated on the official Trafficways Plan for San Francisco. As the exact location of the Western Freeway is not established at this time, temporary terminal connections are provided between the northern end of the freeway and Seventh Avenue.

The design of the connections to Southern Freeway is based on the present expectation that the Southern Freeway will be open to traffic before completion of construction of the Crosstown Freeway. Ramps will permit full interchange of Crosstown Freeway traffic between Portola Drive and between Diamond Street.

The freeway is planned for a design speed of 50 miles per hour, with four 12-foot traffic lanes, 8-foot shoulders along the right hand edge of pavement, and with a 6-foot median between opposing traffic lanes. A physical barrier to prevent head-on collisions will be placed on curves and other selected locations, and the remainder of the length of the median will be planted with shrubbery to reduce headlight glare.

The length of the project is 2.873 miles, of which 0.206 mile is in tunnel, 0.837 mile is on structure, and 1.830 miles are in cut or on fill.

The structural design of bridges is based on the requirements set forth for H20-S16 loadings in the "Standard Specifications for Highway Bridges," The American Association of State Highway Officials, 1953 edition, with subsequent approved revisions.

The geometric standards of the State Division of Highways are followed, except for certain modifications made necessary because of topography and to minimize right-of-way damage. These deviations in geometric standards have been determined in consultation with the City Engineer and the Assistant State Highway Engineer, District IV.

Approximately 75 per cent of the right-of-way is already under City ownership, some parcels of which are unsuitable for building purposes.

The preliminary cost estimate of the facility under study follows.

Temporary connections at northern terminus	\$ 129,000
Section between end of temporary connections and the north portal of Midtown Tunnel	2,869,000
Midtown Tunnel	4,428,000
South portal of Midtown Tunnel to connection with Southern Freeway	<u>5,265,000 *</u>
ESTIMATED TOTAL CONSTRUCTION COSTS	\$12,692,000 *
Rights-of-way, property damage, etc.	2,806,000
Legal, administrative, and engineering - 15%	1,901,000
Contingencies - 20%	<u>2,539,000</u>
ESTIMATED TOTAL PROJECT COST	\$19,938,000 *

I INTRODUCTION

A striking feature of the conformation of land within the City of San Francisco is a group of hills situated almost exactly in the geographical heart of the city. These hills - roughly constituting an elevated circular area about 2.5 miles in diameter and rising to maximum elevation of 909 feet at Mount Sutro, 910 feet at Twin Peaks, and 925 feet at Mount Davidson - dominate the city and constitute one of its most prominent attractions.

Despite their great scenic value, the hills present a serious obstacle to transportation, traffic flow, and community development. During the history of engineering construction within the city, such projects as the Bernal Cut, the Twin Peaks and Duboce streetcar tunnels, and the Market Street-Portola Drive major thoroughfare, have all been concerned with the problem of movement of traffic that goes through, over, or around this imposing physical barrier.

*Includes entire cost of San Jose Avenue bridge. Allocation of cost of this structure has not been made between the City and the State Division of Highways.

Only one pass, in the center portion of the hills, offers a favorable location for construction of a major highway facility. This pass is at present traversed from northeast to southwest by Market Street-Portola Drive, and from northwest to southeast by Laguna Honda Boulevard-Woodside Avenue-O'Shaughnessy Boulevard.

The location for the Crosstown Freeway has been selected through this same pass, following the general route of Laguna Honda Boulevard, Woodside Avenue, and O'Shaughnessy Boulevard.

In the 1948 report "Transportation Plan for San Francisco," the Crosstown Freeway route was identified and described as the "Circumferential Expressway" about which the following comments were made:

"The origin-destination survey revealed that there is considerable traffic which could be attracted to a circumferential route connecting the various outlying parts of the city. For lack of a good continuous route, much of this traffic passes through the congested central area. The 7th Avenue-Woodside-O'Shaughnessy route offers almost a ready-made channel for an express trafficway because of the topography and absence of marginal development along one side or both. This route should be connected directly into the [Southern Freeway] . . . by way of Bosworth Street. Eventually it should be extended across Golden Gate Park to Park Presidio Boulevard for access to the Richmond District and the Golden Gate Bridge. . . ."

The comments are still applicable, although additional study and the rapid growth of traffic now indicate that this trafficway will carry more traffic than was originally anticipated, and, consequently, will be of greater significance than was earlier appraised. From the standpoint of traffic service, the Crosstown Freeway should now be considered as serving the following functions:

1. As a new direct route through an area of rugged topography where the only existing streets are tortuous and inadequate to serve the potential traffic demands. It provides a bypass for congested city streets skirting the periphery of the hill area.
2. As a branch or feeder of the Southern Freeway, opening up a new direct route from the Sunset, Forest Hills, and Richmond Districts and the Golden Gate Bridge to areas served by the Southern Freeway and by the James Lick Memorial (Bayshore) Freeway south of Alemany Boulevard.

3. In conjunction with the Southern Freeway, as an approach to the south shore industrial area, the water front, and to a Southern Crossing of San Francisco Bay.

The preparation of this report and preliminary plans for the proposed Crosstown Freeway was authorized by an agreement with the City and County of San Francisco, dated February 23, 1955, which requires the following specific items of work to be performed:

A review of all existing relevant data and reports;

Analysis of traffic data and assignment of traffic to various alternate routes as a basis for design of main roadways, interchanges, and ramps;

Preliminary right-of-way plans;

Preliminary alignment plans and profiles;

Preliminary structure designs showing typical sections and foundations;

Functional interchange plans;

Typical sections;

Special utility modifications;

Public transportation facilities as affected by the proposed freeway;

Preliminary special provisions of specifications;

Preliminary estimate of the cost of construction;

Preliminary estimate of cost of right-of-way.

II AVAILABLE DATA

Traffic

The origin-destination data developed for the Bay Area Metropolitan Traffic Survey of 1946-1947 and brought up to date as described in our July 1956 "Preliminary Report and Plans for Southern Freeway," was used as a basis for determining the vehicular usage of the proposed freeway.

Foundation Data

Mr. Hyde Forbes, Consulting Engineering Geologist, was retained by the City and County of San Francisco to report on foundation conditions for the proposed Crosstown Freeway and the geological features relating thereto. Under Mr. Forbes' direction, 29 test holes were drilled at various locations, involving 1,383 linear feet of boring. A total of 30 core samples and 48 bottle samples was obtained for analysis. His findings are discussed in his report of October 1, 1956, "Investigation of Ground and Water Conditions in Relation to Foundation Treatment, Proposed Crosstown Freeway, San Francisco, California."

Additional data on foundation conditions were obtained from logs of wells and from construction and pile-driving records of projects along the route of the freeway, including the Bosworth Street Bridge, Mission Street Viaduct over Alemany Boulevard, Laguna Honda Home, Youth Guidance Center, Twin Peaks Tunnel, and sewer projects.

Right-of-Way Costs

The Real Estate Department of the City furnished appraisals of property required by the various alignment studies.

City Maps and Topographic Data

The Bureau of Engineering supplied the following data from its records, or procured them from other agencies:

City facilities:

Plans showing the layout of improvements at Laguna Honda Home, Youth Guidance Center, Silver Tree Day Camp, and Glen Park Playground; existing and proposed city streets; domestic and high-pressure auxiliary water supply lines; sewers; Twin Peaks streetcar tunnel and Forest Hill Station; other facilities of the Municipal Railway; and proposed projects of the Redevelopment Agency. The City also furnished a recently-completed aerial mosaic prepared at a scale of 1"=200'; photographic enlargements at a scale of 1"=80'; contour maps, with 2-foot contour intervals, at a scale of 1"=40'; and planimetric maps at a scale of 1"=40'.

State-controlled facilities:

Preliminary plans of the portion of the Southern Freeway being designed by the State Division of Highways in the vicinity of the present intersection of Mission Street and Alemany Boulevard.

Public Utilities

The Bureau of Engineering obtained the following information from the public utility companies concerned:

Pacific Gas and Electric Company:

Location of existing and proposed utility facilities, including gas lines, overhead electric power lines, and underground duct lines.

The Pacific Telephone and Telegraph Company:

Location of underground cables and overhead lines, required clearances, and standards.

III ENGINEERING STUDIES

Traffic Estimates

The estimate of traffic which would use the proposed freeway and its connections was based upon a joint study made by the District IV Traffic Department, State Division of Highways, and De Leuw, Cather & Company.

Estimates were made of 1980 vehicular trips based upon expected land use and normal growth in population and vehicle ownership. The trips were assigned to the network of freeways, illustrated on Plate I, planned by the State and the City for the year 1980, as described in the report "Preliminary Report and Plans for Southern Freeway," July 1956. The preliminary estimates indicated that under normal conditions approximately 30,000 vehicles per day would use the proposed facility by 1980.

It is well recognized that improvements in transportation facilities of any character induce substantial increments of traffic beyond those anticipated solely from a population-vehicle ownership analysis. The location of the Crosstown Freeway is such that as the capacity of the James Lick Memorial Freeway is reached, additional pressure may be exerted on the Crosstown Freeway. Taking these factors into consideration, it seems reasonable to assume that the total daily traffic in 1980 will reach 48,000 vehicles, which warrants the use of freeway criteria as a basis for design.

As the Crosstown Freeway is a circumferential route, rather than a radial route from the central business district, we expect that the volume of traffic in each direction during the rush hours will be relatively evenly balanced, and we estimate that the movement in the heavier direction during the peak hours will approximate five per cent of the daily two-way traffic.

Plates II and III indicate, respectively, the daily and peak-hour vehicular volumes estimated for 1980.

Relationship to Public Transit

As the alignment of the freeway is generally perpendicular to existing and proposed main trunk transit routes, it is our opinion that future transit developments will not materially affect the vehicular volumes estimated for the future.

Discussions with representatives of the Municipal Railway indicate that there is no foreseeable need for special bus turnouts or loading zones along the freeway. However, the recommended alignment of the freeway will require some alteration to bus terminal arrangements at Forest Hill Station.

Location Studies

The location of the Crosstown Freeway is dictated primarily by topographic conditions, which confine the route of the freeway to the Laguna Honda ravine, north of Portola Drive, and to Glen Canyon, south of Portola Drive.

The route through the Laguna Honda ravine is restricted, as the only available land is a narrow strip between developed residential property on the west slope of the ravine, and City institutions on the east slope. The location recommended requires the removal of only a relatively small number of private residences.

In Glen Canyon we studied three side-hill locations, two on the west slope of the canyon and one on the east slope. See Plate IV.

An east-slope location would require the acquisition of land presently planned for residential purposes under the Diamond Heights redevelopment plan, and would impose a barrier between the redevelopment area and the Glen Canyon recreational area. From a long-range point of view, a west-slope location required less over-all acquisition of existing and potential residential properties than an east-slope location; and, as an east-slope location has no compensating advantages, we favor a location on the west slope.

As indicated on Plate IV, the two west-slope alignment studies are similar, and they differ primarily in the earthwork quantities required. Although it requires more earthwork, the alignment recommended and presented on Plate V reduces the encroachment on Glen Park Playground, is compatible with the development of the Silver Tree Day Camp, and has been formally approved by the San Francisco Recreation and Park Commission.

Geology and Foundation Conditions

Mr. Forbes' report generally described the two sections of the freeway route north and south of the summit at Portola Drive as lying along two

topographic gullies. The southeasterly portion of the freeway route along Bosworth Street and O'Shaughnessy Boulevard lies on the south slope of a large gully down which the drainage from about one square mile of the San Miguel Hills once flowed to Islais Creek. The topographic gullies and smaller irregularities in the vicinity of Portola Drive have been filled in and partially leveled by sand and gravel, with windblown dune sand predominating except in the southeast, where stream deposits are found. The basement rock under these wind and stream deposits consists of the hard, dense Franciscan formation, which is a complex of intrusive rock and metamorphosed sandstones and cherts. This basement rock is capable of supporting very heavy loads after its weathered upper zone of clay-filled, jointed rock is passed through.

Subsurface conditions as disclosed by the preliminary borings are described in Mr. Forbes' report, and are graphically presented in Drawing R-13 in the appendix of this report. The description which follows is a summary of the core boring information and Mr. Forbes' conclusions. It should be noted that this summary is a generalization of soil conditions, which vary greatly from point to point and with depth.

Beginning at the intersection of Clarendon Avenue with Laguna Honda Boulevard, outcrops of the hard basement rock are found at the surface. Proceeding along Laguna Honda Boulevard and Woodside Avenue, dune sands and clayey sands lying on a clay layer above the basement rock are encountered to depths ranging up to 80 feet in the vicinity of the Laguna Honda Home, and then growing progressively less as the summit is approached. In some cases, especially along Woodside Avenue where old fill is present above the dune sand, Mr. Forbes recommends that some of the surface material be removed to reach a firm, moisture-proof base for the freeway.

The northern portion of the tunnel excavation will be in fill and dune sand, with the basement rock of diabase being over 15 feet below profile grade. However, in the southern half of the excavation (except directly at the south portal) the diabase will be encountered in an unweathered condition at about 15 feet above profile grade. This hard rock has a density of 195 pounds per cubic foot and is expected to be self-supporting when excavated in vertical cuts.

Just south of the tunnel the freeway will encounter wet clays and sands in cut and fill, which will necessitate subdrainage facilities.

Proceeding south along O'Shaughnessy Boulevard, the freeway will be in a cut on a steep side hill, in an area of hard basement rock covered mostly by rock and soil fill. This cut can be expected to ravel and slough with exposure to weathering. Mr. Forbes recommends that benches be provided at the bottom of cuts to catch rock falls. In one place the soil above the basement rock is landslide material, stabilized in 1945 by installation of drainage facilities. Most of the landslide overburden material will be removed in connection with the excavation operations.

In the area of the projected Bosworth Street Viaduct, various depths up to 90 feet of unconsolidated fill, clay and sand, or weathered material will be encountered before solid rock is reached. This will necessitate piles for support of the viaduct. Although the longest piles will be at a point where the underlying strata dip steeply to the north, the report states that no trouble from shifting of the soil will be encountered.

East and south of San Jose Avenue, in the vicinity of the interchange with the Southern Freeway, the Crosstown Freeway will be located primarily in cut. Earth materials in this area consist of street fills, topsoil and sand, overlying clay beds, and decomposed rock which, in turn, cover the solid basement rock. Mr. Forbes anticipates no foundation problems in this area.

IV DESIGN CRITERIA

Geometrics

Since the Crosstown Freeway will be a unit in the ultimate freeway system serving the City of San Francisco, and since adjoining sections of freeway will be under the jurisdiction of the State Division of Highways, the plans have been prepared in accordance with the design criteria of the Division of Highways, except where the terrain necessitates slight modifications. The following standards were adopted:

Design speed	50 m.p.h.
Lane width	12 feet
Minimum radius for horizontal curves	850 feet
Grades, maximum upgrade	5.14 per cent northbound 4.41 per cent southbound
Superelevation	10.00 per cent maximum
Rate of superelevation runoff	1:150
Superelevation runoff	2/3 on tangent 1/3 on curve
Stopping sight distance	350 feet
Clearance from edge of pavement to curbs on structures or in tunnels, where length exceeds 150 feet	2 feet

Vertical clearances over or under city streets	15 feet minimum
Shoulder width	8 feet outside 2 feet inside
Width of median	6 feet plus two 2-ft. gutters 12 feet on viaduct

Datum

The plans for the Crosstown Freeway have been prepared using elevations based on the City of San Francisco datum, which is 8.616 feet above sea level (1929 Adjustment).

The plans prepared by the California Division of Highways for the Southern Freeway in the area of the Southern Freeway-Crosstown Freeway interchange are based upon the United States Coast and Geodetic Survey datum (1929 Adjustment). To convert elevations from City of San Francisco datum to United States Coast and Geodetic Survey datum (1929 Adjustment), add 8.616 feet.

Structural Criteria

Structural designs are in accordance with the requirements of "Standard Specifications for the Design of Highway Bridges," 1953 edition, The American Association of State Highway Officials, with subsequent approved revisions. Members were proportioned for stresses deriving from combinations of dead load, live load, earth pressure, impact, temperature stress, centrifugal force, longitudinal force, wind force, and seismic force, as indicated in the following tabulation:

Group I; dead load, live load, impact, centrifugal force, and earth pressure, for which the unit stresses specified were used.

Group II; dead load, earth pressure, and wind load, for which unit stresses may be increased 25%.

Group III; Group I plus longitudinal force due to live load and friction, plus 30% wind load on the structure, plus one-half wind load on the live load, for which unit stresses may be increased 25%.

Group IV; Group I plus shrinkage, plus temperature, for which unit stresses may be increased 25%.

Group V; Group II plus shrinkage, plus temperature, for which unit stresses may be increased 40%.

Group VI; Group III plus shrinkage, plus temperature, for which unit stresses may be increased 40%.

Group VII; dead load, plus earth pressure, plus seismic force, for which unit stresses may be increased 33-1/3%.

A seismic coefficient of .06 was used for structures supported on pile foundations and .02 or .04 for structures on spread footings. This coefficient was applied to the dead load of the structure.

The design live load conforms to AASHO H20-S16 loading. This is a hypothetical live load consisting of a truck and semitrailer, having a total of three axles, and with a total load of 36 tons distributed on the three axles as follows: 4 tons; 16 tons; 16 tons. In the design of the multi-lane structures, the AASHO design truck loadings are assumed to exist in each lane of the roadway.

Reinforced concrete designs have been prepared, assuming intermediate grade steel conforming to the material requirements of ASTM A15, with deformations conforming to the requirements of ASTM A305. Class B concrete is assumed to have an ultimate strength of 3,000 pounds per square inch, and Class BI to have 2,500 pounds per square inch. Working stresses for concrete were assumed at 1,200 pounds per square inch for Class B concrete and 1,000 pounds per square inch for Class BI concrete. Bridges in which welded structural steel is employed are designed for ASTM A373 steel.

Where prestressed concrete designs were made, concrete was assumed to have an ultimate strength of 5,000 pounds per square inch. No definite allowable stress was assumed for the high tensile steel used for pretensioning or posttensioning, since it was assumed that the design should be flexible so as to accommodate any common prestressing method or material likely to be selected by the Contractor.

For the preliminary structural design of the tunnel, the design criteria and assumptions are set forth in a subsequent section of this report.

V RECOMMENDED PROJECT

General

The traffic estimates indicate that a four-lane facility, constructed to freeway standards, will initially accommodate expected vehicular volumes.

The portion of the route from the interchange with the Southern Freeway to the tunnel is approximately 1.5 miles long and has a grade slightly steeper than 5 per cent. At some later date when the usage of

the freeway approaches capacity, it would be necessary to construct a third northbound lane for slow-moving vehicles. We recommend, therefore, that during initial construction embankment be placed for a future third northbound lane from the Bosworth Street Viaduct to the Midtown Tunnel.

Studies of projected vehicular movements to and from the freeway indicate the need for direct connections to the section of the Southern Freeway east of Mission Street and to the section of the proposed Western Freeway that would lie north of the project. As the location of the Western Freeway is unsettled at present, our plans provide ramp connections to Seventh Avenue near Lawton Street.

Connections are provided to and from Portola Drive for both northbound and southbound freeway traffic. Ramps at Diamond Street permit vehicles to reach both San Jose Avenue and the section of the Southern Freeway west of Diamond Street via the city streets.

A detailed description of the project follows.

Identification

For purposes of this study, the stationing of the trunk portion of the freeway is computed from north to south. Stationing for the trunk portion and for the ramps is identified by the following prefix letters:

<u>Description</u>	<u>Prefix</u>
Portions of Main Trunk of Freeway	
Main trunk	None
Northbound leg from Seventh Avenue to vicinity of Clarendon Avenue	A
Northbound leg from Southern Freeway to vicinity of San Jose Avenue	B
Ramps to and from Portola Drive	
Southbound off-ramp to Ulloa Street and Woodside Avenue	C
Northbound on-ramp from Woodside Avenue	D
Southbound on-ramp from O'Shaughnessy Boulevard	E
Northbound off-ramp to O'Shaughnessy Boulevard and Portola Drive	F
Ramps to and from Diamond Street	
Southbound off-ramp	G
Northbound on-ramp	H

Northern Terminus

(Station A 35 + 80 to Station A 58 + 15)
(Station 39 + 00 to Station 56 + 77)
(Average length, 0.380 mile)

This portion of the project consists of two separate two-lane roadways on cut and fill from the intersection of Seventh Avenue and Lawton Street to the north side of Laguna Honda Reservoir. Chanellization and signalization are provided at the intersection. When the location of the proposed Western Freeway is determined, the connections to Seventh Avenue may be abandoned, and the Crosstown Freeway may be connected to the Western Freeway at Station A49 + 00 on the northbound leg and at Station 45 + 00 on the southbound leg, or the Crosstown Freeway may be extended from those stations in the event that the Western Freeway is constructed at a more distant location.

Reservoir Bridges to North Portal of Tunnel

(Station A 58 + 15 to Station 95 + 55)
(Station 56 + 77 to Station 95 + 55)
(Average length, 0.714 mile)

This section of the freeway commences with two separate two-lane bridges across Laguna Honda Reservoir.

It is necessary to bridge the reservoir because the ravine is narrow at this point and because it is necessary to retain Laguna Honda Boulevard as a thoroughfare for local traffic. Although water stored in the reservoir has not been used as a domestic supply since 1937, there are no immediate plans for abandonment of the reservoir. Therefore, the plans for the project are based upon the assumption that the reservoir will continue in a standby status.

The Laguna Honda Reservoir was built prior to the 1906 earthquake. All construction records and design plans were lost during the fire following the earthquake; consequently, little is known concerning the construction of the reservoir, or of the materials underlying it. However, it is believed that the reservoir is lined with a thickness of approximately 2 feet of unreinforced concrete.

Prior to final design, full investigation of subsurface conditions at the reservoir must be made. However, for the purposes of this preliminary report, a tentative design in prestressed concrete has been selected for the bridges, primarily in the interest of minimizing maintenance expenses.

The bridges pass over Clarendon Avenue, at which point the span width permits the future widening of Clarendon Avenue to a four-lane divided thoroughfare.

South of Clarendon Avenue the freeway is generally a four-lane divided roadway on cut and fill on the westerly portion of the grounds of Laguna

Honda Home. As the result of cooperation with officials responsible for the development of the Home, planned improvements within the grounds of the Home have been designed, so far as possible, to lie outside the limits of right-of-way required for the freeway. A new entrance road and pedestrian walkway from Laguna Honda Boulevard is provided opposite Plaza Street under the freeway.

A bus loop around Forest Hills Station replaces the present bus turnaround and bus stop on Laguna Honda Boulevard.

The freeway crosses Woodside Avenue in the vicinity of Vasquez Avenue and Balceta Avenue. A structural steel bridge on concrete bents has been selected for this crossing because of the skew and restricted clearance at this location. Selection of structural type at this location should be reviewed during final design, with particular attention given to a reinforced concrete structure.

A northbound on-ramp connects Woodside Avenue with the freeway at a point approximately opposite Hernandez Avenue. A southbound off-ramp terminates at the intersection of Ulloa Street and Woodside Avenue. These ramps, in conjunction with existing streets, constitute in effect half of a diamond-type interchange with Portola Drive.

A new street is located adjacent to the off-ramp and connects Balceta Avenue and Ulloa Street, thus preventing the deadending of Hernandez Avenue and Idora Avenue, which are denied direct access to Woodside Avenue by the freeway.

Midtown Tunnel

(Station 95 + 55 to Station 106 + 44)
(Length, 0.206 mile)

A tunnel crossing beneath Portola Drive not only provides grade separation, but also provides minimum grades and causes the least disturbance to existing improvements and local streets.

The tunnel, tentatively named the Midtown Tunnel, is a twin-bore, four-lane, reinforced concrete tunnel, to be constructed by the open-cut method.

Two different designs have been prepared for the tunnel to reflect two different foundation conditions: one for construction where the tunnel is located substantially in solid rock, with the concrete of the tunnel section poured directly against the neat sides of the rock cut; and the other, where the tunnel is substantially located in sand. For the solid rock condition, no side pressure from the rock is assumed. An equivalent hydrostatic pressure of 36 pounds per square foot applied to vertical surfaces is used for the design of the tunnel section in sand materials. Longitudinal side drains and weepholes will be installed to reduce to a minimum the actual hydrostatic pressures applied to the side-walls of the tunnel.

Fill on top of the tunnel has been assumed to weigh 120 pounds per cubic foot. Because of the depth, highway live loads on the streets over the tunnel have been neglected.

Structural designs for the tunnel sections have been based on Class B concrete with an ultimate strength of 3,000 pounds per square inch and a maximum working stress of 1,200 pounds per square inch.

Because construction joints are spaced at 40-foot intervals, and because of the relatively heavy type of construction and the nature of the foundation materials, no special additional strengthening is considered necessary for seismic forces.

Our studies indicate that mechanical means are required to furnish an adequate supply of fresh air to the tunnel.

A ventilation shaft and fan room are located under Woodside Avenue immediately west of Portola Drive. An automatically-controlled and operated system is contemplated, capable of delivering 310,000 cubic feet per minute of fresh air to the tunnel. The system will include alarm devices to warn of malfunctions of the equipment or the excessive concentration of noxious gases.

The tunnel will be lined with ceramic tile, for easy maintenance with existing City-owned tunnel-cleaning equipment, and will be illuminated with high-intensity fluorescent lights. Special lighting will be installed at the portals of the tunnel to provide a gradual reduction in the intensity of illumination. This will avoid an abrupt change from bright daylight to the artificial lighting conditions in the tunnel.

South Portal of Tunnel to Bosworth Street Viaduct

(Station 106 + 44 to Station 147 + 77)
(Length, 0.783 mile)

From the south portal of the tunnel the four-lane freeway descends the west slope of Glen Canyon in side-hill cuts and fills, on a 5.14 per cent grade generally following and to the east of O'Shaughnessy Boulevard, to the horseshoe curve opposite Glen Park Playground, at which point viaduct construction commences. This portion of the freeway replaces O'Shaughnessy Boulevard. Approximately 1,000 feet east of Portola Drive a northbound off-ramp connection provides access to Portola Drive from the freeway. A shorter ramp from O'Shaughnessy Boulevard, east of Portola Drive, provides access to the freeway for southbound traffic. These ramps constitute the southerly pair of ramps of the diamond-type interchange with Portola Drive.

Almost one-half of the 823,000 cubic yards of excess excavation of the project is generated along the O'Shaughnessy Boulevard cuts. As the right-of-way along this section of freeway is owned by the City, it is recommended that a portion of the excess material be placed as embankment to provide the previously-mentioned future third northbound lane from the viaduct to the Portola Drive off-ramp.

Bosworth Street Viaduct

(Station 147 + 77 to Station 173 + 41)
(Length, 0.580 mile)

The viaduct meets the cut and fill section at the north end of the O'Shaughnessy Boulevard horseshoe curve, swings across the ravine to the north side of Bosworth Street, and continues on a generally parallel alignment to an abutment approximately 160 feet west of San Jose Avenue.

Bosworth Street, Elk Street, Chilton Avenue, Lippard Avenue, and Diamond Street are open to vehicular traffic under the viaduct. Brompton Street is closed to vehicular traffic, but remains open to pedestrian traffic. The existing Burnside Avenue pedestrian stairway to Bosworth Street remains open.

Access to the freeway for northbound vehicles is provided by an on-ramp which starts on the west side of Diamond Street at Kern Street, rises on a 10 per cent grade, and merges with the freeway in the vicinity of Burnside Avenue. This ramp will accommodate Crosstown Freeway-bound vehicles originating in the immediate vicinity, vehicles from San Jose Avenue, and those from the portion of Southern Freeway west of Diamond Street.

The viaduct structure provides a four-lane divided roadway, on a single deck, with a 12-foot mountable median for emergency parking, and with safety curb and parapet on each side. Our studies indicate that at present the most economical construction from the long-term point of view consists of a cast-in-place concrete deck supported by precast, pre-stressed concrete girders and cast-in-place concrete bents on piles.

An off-ramp from the southbound freeway lanes terminates on the east side of Diamond Street near San Jose Avenue. This ramp is planned to serve the return trips for those vehicles utilizing the Diamond-Kern on-ramp.

Bosworth Street Viaduct to Southern Freeway

(Station 178 + 41 to Station 185 + 29.25)
(Station B178 + 41 to Station B187 + 52)
(Average length, 0.152 mile)

This portion of the freeway consists of two separate two-lane roadways at grade which constitute the direct connections of the Crosstown Freeway to the portion of the Southern Freeway east of Mission Street.

The freeway passes under San Jose Avenue immediately north of the existing Bosworth Street bridge. A short section of Bosworth Street, east of San Jose Avenue, will be carried over the freeway on an overcrossing structure. A new connection, New Bosworth Street, is made from Bosworth Street to the east side of Diamond Street, opposite Kern Street.

A new roadway connects the Wilder Street-Arlington Street-San Jose Avenue intersection with the east side of Diamond Street opposite Kern Street, and provides a convenient transfer route for San Jose Avenue westbound vehicles destined northbound on the Crosstown Freeway.

The existing San Jose Avenue bridge over Bosworth Street will be replaced with a new bridge, of reinforced concrete box girder construction supported on piles, spanning New Bosworth Street, the Crosstown Freeway, and Bosworth Street.

Plate VI illustrates the interchange at the southern terminus of the project. The California Division of Highways will design and construct this interchange.

VI STAGE CONSTRUCTION

The Crosstown Freeway lends itself to stage construction, starting at the junction with the Southern Freeway and proceeding north. Each individual stage, when completed, would make available a usable section of freeway.

The recommended sequence of construction is dictated in part by traffic service and in part by the need to coordinate the City's freeway construction with that of the State Division of Highways.

The recommended first stage consists of those portions of the interchange with the Southern Freeway that are under the jurisdiction of the City. These include the new San Jose Avenue bridge, the Bosworth Street bridge, temporary roadway connections to Diamond and Bosworth Streets, and the abutment at Station 178 + 41, near Diamond Street, for the proposed Bosworth Street Viaduct. We recommend that this construction be undertaken concurrently with the construction of the Southern Freeway. This will effect coordination with the operations of the State's contractors, and will provide connections to the eastern portion of the Southern Freeway.

As the second stage we recommend construction of the portion of the freeway beginning at the aforementioned abutment east of Diamond Street, and extending up Glen Canyon to and including the ramps at Portola Drive.

For the third stage we recommend construction of the the Midtown Tunnel. This facility will extend the usable length of the freeway for about one-half mile from the ramps at Portola Drive to a temporary connection to Woodside Avenue in the vicinity of Hernandez Avenue. We recommend that construction of the Midtown Tunnel be undertaken as soon after the completion of the previous stages as financing permits. With increasing traffic volumes on Portola Drive, each year of delay will accentuate the problems encountered in carrying Portola Drive traffic through the site of tunnel construction. Moreover, construction of the tunnel will permit

modification of traffic control measures at Portola Drive and will tend to increase the capacity of the important Portola Drive-Market Street arterial in this area.

The temporary connections to Woodside Avenue, north of the tunnel portal, would permit traffic on Woodside Avenue with destinations along the Southern Freeway and the James Lick Memorial Freeway to proceed directly into the tunnel.

As the final stage we recommend construction of the portion of freeway in Laguna Honda ravine, extending from the north portal of the Midtown Tunnel to the northern terminus of the freeway.

The over-all recommended timetable for design and construction is shown in the following tabulation:

<u>Construction Stage</u>	<u>Route Adoption</u>	<u>Acquisition of Right-of-Way and Preparation of Construction Plans</u>	<u>Advertising and Award of Construction Contract</u>	<u>Facility Open to Traffic</u>
<u>1</u> From Southern Freeway to Diamond Street	Spring 1958	1958-1959	Fall 1959 Concurrently with letting of State contract on Southern Freeway in this area	1961 Concurrently with opening of Southern Freeway to traffic
<u>2</u> From Diamond Street to Portola Drive	Spring 1958	1958-1960	Spring 1960	1962
<u>3</u> Midtown Tunnel with temporary connection to Woodside Avenue	Spring 1958	1959-1960	Spring 1961	1963
<u>4</u> From north portal of Midtown Tunnel to northern terminus	Spring 1958	1960-1961	1963	1965

VII DESIGN FEATURES

Pavement

We recommend two types of paving for the Crosstown Freeway.

For the portion of freeway between the north terminus and Bosworth Street Viaduct, the pavement design follows standard City practice, an 8-inch concrete base on a prepared rock subbase with a 2-inch thick asphaltic wearing surface. The asphaltic surface permits the later addition of asphaltic leveling courses to correct unevenness that may be caused by settlements. The edges of the roadway along the median strip are delineated by portland cement concrete, and at the right of the outer lanes by a contrasting texture of plant-mixed surfacing or, as an alternative, by screenings applied to the shoulder area.

For the portion of the freeway between Bosworth Street Viaduct and the Southern Freeway, we recommend a concrete pavement consistent with the roadway surface of the Southern Freeway and the viaduct. The tentative roadway section selected consists of an 8-inch concrete pavement on a 4-inch cement-treated base and a 12-inch graded subbase.

Structures

Bridges and viaducts are designed to conform to current State Division of Highways practices, and are provided with a recessed, non-mountable curb on each side, a 1'-10" safety walkway, solid reinforced concrete parapet 1'-6" high, and a 5-inch galvanized steel or aluminum railing mounted on top of the parapet. Flared metal-plate guardrails are placed at the approaches to all bridges to prevent collisions with railing end posts.

The main trunk freeway structures are designed to provide a minimum width between curbs of 28 feet for each roadway, except that the bridge over the entrance road to Laguna Honda Home carries the full roadway section, including shoulders, because of its short length. The decks and wearing surface of all structures are reinforced concrete. The median area will be delineated by the application of a 1-1/4-inch thickness of asphaltic plant-mix surfacing.

Traffic Signals

In addition to the existing installation at the intersection of Portola Drive, Woodside Avenue, and O'Shaughnessy Boulevard, which is redesigned, traffic signal installations are planned at the following locations:

- Seventh Avenue and Lawton Street
- Diamond Street and New Bosworth Street
- Diamond Street and off-ramps at San Jose Avenue

Signing and Lighting

Illuminated overhead signs, designed and located in accordance with State Division of Highways standards, are planned for the guidance of traffic at off-ramps.

Roadway lighting is provided along the on- and off-ramps, the merging and diverging areas, through and along the approaches to the Midtown Tunnel, and on the San Jose Avenue Bridge. Lighting is also provided under structures where the freeway and its ramps pass over city streets.

Median Strip Development

To minimize the hazard of head-on collisions, we recommend a physical barrier in the 6-foot-wide median strip on all short-radius curves, and at other selected locations.

A barrier which could also serve as a screen to reduce headlight glare would be desirable. The actual type of barrier to be selected and the type of headlight screen for use on tangent portions of the freeway will be determined when construction plans are prepared.

Fencing

In general, a 6-foot chain link fence will be erected along the right-of-way line. In park lands and institutional grounds the location of the fence would be established as agreed upon with the appropriate authorities.

Fencing of areas under the Bosworth Street Viaduct should be made a matter of further study, once a policy has been determined concerning the use of these areas.

Landscaping

The Crosstown Freeway will be fully landscaped to, provide protection against erosion of cut and embankment slopes, to reduce the annoyance of headlight glare, and to conform with the landscaping of adjacent City parks, institution grounds, and private homes. The landscaped freeway will, in essence, be of the parkway type, and thus will be an important addition to the scenic assets of the City.

During the clearing and grubbing operations, all work will be carefully controlled to prevent unnecessary damage to shrubbery, lawns, or existing landscaping. Boxes or tree wells will be constructed to preserve trees at the toes of slopes.

Selected cut and fill slopes will be treated as necessary with loam or topsoil to provide suitable soil for plant nourishment, and ice plant and other native vegetation will be placed to afford permanent protection

against erosion. Temporary protection will be provided with rye grass. Shoulder areas beyond the edge of paved surface will be planted with ice plant.

In the Glen Canyon area the fill slope will be planted to harmonize with the natural vegetation on the opposite wall of the canyon. Boulders placed on the embankment will also assist in simulating a natural appearance.

VIII RIGHT-OF-WAY REQUIREMENTS

The basic right-of-way width for the four-lane divided facility varies throughout the length of the project because of deep cuts and high fills. In certain instances the width has been narrowed to protect private property, where such reduction will not impair the utility of the freeway.

The following tabulation indicates the number of parcels of property which must be acquired for the freeway:

<u>Portion of Freeway</u>	<u>Private Unimproved</u>	<u>Improved Residential</u>	<u>Improved Commercial</u>	<u>City- Owned</u>
Temporary connections at north terminus	-	-	-	3
Temporary connections to north portal of Midtown Tunnel	1	17	-	4
Midtown Tunnel	-	14	1	-
South portal of tunnel to connection with Southern Freeway	<u>18</u>	<u>89</u>	<u>12</u>	<u>19</u>
TOTAL	19	120	13	26

After completion of the tunnel and placement of backfill, seven of the residential parcels between Ulloa Street and Portola Drive, and the commercial parcel, will again become suitable for private use and can be resold, subject to subsurface tunnel easement.

In terms of length of roadway, the relative amounts of privately- and publicly-owned land are as follows:

<u>Portion of Freeway</u>	<u>Privately Owned</u>		<u>Publicly Owned</u>	
	<u>Length in Miles</u>	<u>Per Cent of Total</u>	<u>Length in Miles</u>	<u>Per cent of Total</u>
Seventh Avenue to south side of Portola Drive	0.229	8.0	1.067	37.3
South side of Portola Drive to north side of Diamond Street	0.349	10.8	1.008	35.2
North side of Diamond Street to connection with Southern Freeway	<u>0.157</u>	<u>5.5</u>	<u>0.091</u>	<u>3.2</u>
TOTAL	0.735	24.3	2.166	75.7

Right-of-way requirements are shown on drawings R/W-1 to R/W-6 inclusive, in the Appendix.

The right-of-way drawings indicate only the amount of land necessary for the initial four-lane facility. During the final design stage, consideration should be given to the construction of embankment to permit the installation of a third northbound lane between the north end of the Bosworth Street Viaduct and the south portal of the tunnel.

IX ESTIMATE OF COST

For the purposes of developing a preliminary construction cost estimate, the various contract items of work were determined and the quantities of each item were computed. To these quantities, unit and lump-sum prices were applied, based on current bid prices on contracts embracing similar items of work and adjusted for such special conditions as topography, accessibility of various portions of the work, and other factors unique to this project. Recent increases in the basic prices of materials and of labor were also taken into consideration. The prices include direct, indirect, and overhead costs.

Right-of-way estimates, furnished by the Real Estate Department of the City and County of San Francisco, include severance damages and damages to remainders.

Legal and administrative expenses cover the City salaries and expenses, including administrative, accounting, legal and other personnel, and all costs incidental to the acquisition of right-of-way. Engineering costs include all expenses incurred for the preparation of plans and specifications, final surveys, investigations of subsurface conditions, borings and soil tests and their analyses, the preparation of contract documents, the analysis of bids, the checking of shop drawings, the inspection of all construction work, the coordination and scheduling of all construction contracts - in short, all engineering service necessary to the undertaking.

A summary of the estimates of cost and detailed estimates for sections of the project are presented on the following pages.

X ACKNOWLEDGMENTS

Several organizations have been of assistance in the preparation of this report.

We are indebted to the Bureau of Engineering of the Department of Public Works, City and County of San Francisco, for its promptness in furnishing information and for its valuable assistance in coordinating the efforts of all interested agencies, both within and outside the City government;

To District IV, Division of Highways, Department of Public Works, State of California, for furnishing layouts and plans for the Southern Freeway, for its able assistance in preparing traffic estimates, and for suggestions concerning design features of the project;

To the Recreation and Park Department, City and County of San Francisco, for its assistance and suggestions relating to landscaping of the freeway;

To the Department of Public Health and the Bureau of Architecture, City and County of San Francisco, for their assistance in the development of the alignment through the grounds of the Laguna Honda Home;

To the Municipal Railway and the Water Department of the San Francisco Public Utilities Commission for their aid in planning the project in locations where their facilities are involved;

To the Pacific Gas and Electric Company and The Pacific Telephone and Telegraph Company for their valuable assistance in furnishing information concerning their existing facilities and requirements.

To all of the above-named organizations and their personnel, we express our sincere appreciation and thanks for their cooperation and assistance.

SUMMARY OF ESTIMATES OF COST

Section	Description	Construction	Rights-of-Way	Legal, Administrative and Engineering - 15%	Contingencies 20%	Total Estimated Cost
I	Temporary Connections at North Terminus	\$ 129,000	\$ 3,000	\$ 19,000	\$ 26,000	\$ 177,000
II	Section Between End of Temporary Connections and North Portal of Midtown Tunnel	2,869,000	587,000	430,000	574,000	4,460,000
III	Midtown Tunnel	4,428,000	177,000	664,000	886,000	6,155,000
IV	South Portal of Midtown Tunnel to Connection with Southern Freeway	5,266,000 *	2,039,000	788,000	1,053,000	9,146,000 *
	TOTALS	\$12,692,000	\$2,806,000	\$1,901,000	\$2,539,000	\$19,938,000 *

*Includes entire cost of San Jose Avenue bridge. Allocation of cost of this structure has not been made between the City and the State Division of Highways.

PRELIMINARY DETAILED ESTIMATE OF COST

SECTION I - TEMPORARY CONNECTIONS AT NORTH TERMINUS

	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Amount</u>
<u>Grading and Drainage</u>				
Clearing and Grubbing	3	acre	750.00	\$ 2,250
Roadway Excavation, unclassified	30,900	c.y.	1.00	30,900
Roadway Drainage		l.s.		4,500
Removing Existing Sidewalk & Curb	35	c.y.	4.00	140
Ditch Paving	3,100	l.f.	0.40	1,240
Landscaping		l.s.		5,000
Subtotal				\$ 44,030
<u>Roadway Paving</u>				
12" Untreated Rock Base	5,790	ton	2.50	14,475
8" P.C. Concrete Pavement Base	1,100	c.y.	22.00	24,200
Asphalt Concrete Wearing Surface	1,000	ton	7.25	7,250
Metal Plate Guard Rail	1,700	l.f.	7.00	11,900
Bituminous Concrete Dike	1,850	l.f.	0.25	463
Subtotal				\$ 58,288
<u>Miscellaneous Items</u>				
72" Chain Link Fence	2,500	l.f.	2.50	\$ 6,250
Gates	2	each	150.00	300
Freeway Lighting		l.s.		11,500
Sign Frames and Supports	4,000	lb.	0.40	1,600
Traffic Signals	Various	unit pay items		6,000
Modifications to Street Lighting		l.s.		700
Subtotal				\$ 26,350
TOTAL				\$128,668
Legal, Administrative, and Engineering - 15%				19,000
Contingencies - 20%				26,000
TOTAL CONSTRUCTION COST				\$174,000
Estimated Right-of-Way Cost				3,000
ESTIMATED TOTAL COST - SECTION I				<u>\$176,000</u>

PRELIMINARY DETAILED ESTIMATE OF COST

SECTION II - SECTION BETWEEN END OF TEMPORARY CONNECTIONS
AND THE NORTH PORTAL OF MIDTOWN TUNNEL

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
<u>Grading and Drainage</u>				
Clearing and Grubbing	15	acre	750.00	\$ 11,250
Roadway Excavation, unclassified	426,500	c.y.	1.00	426,500
Roadway Drainage		l.s.		12,500
Removing Existing Sidewalk & Curb	2,365	c.y.	4.00	9,460
Ditch Paving	8,000	l.f.	0.40	3,200
Removing Concrete Retaining Walls, etc.	980	c.y.	16.00	15,680
Landscaping		l.s.		<u>10,000</u>
Subtotal				\$488,590
<u>Roadway Paving</u>				
12" Untreated Rock Subbase	25,724	ton	2.50	64,310
8" P.C. Concrete Pavement Base	4,535	c.y.	22.00	99,770
Asphalt Concrete Wearing Surface	5,050	ton	7.25	36,613
Concrete Curb - Type A-1	4,835	l.f.	1.75	8,460
Concrete Curb & Gutter - Type A-2	6,455	l.f.	2.25	14,524
Metal Plate Guard Rail	2,070	l.f.	7.00	14,490
Bituminous Concrete Dike	3,410	l.f.	0.25	853
New Concrete Sidewalk	10,090	s.f.	0.40	<u>4,036</u>
Subtotal				\$243,056
<u>Structures</u>				
Excavation, Structural	10,800	c.y.	3.75	\$ 40,500
Backfill	18,700	c.y.	2.75	51,425
Crushed Stone Drains	1,810	ton	4.00	7,240
Concrete - Class B Superstructure	2,680	c.y.	65.00	174,200
Concrete - Class B Substructure	6,950	c.y.	60.00	417,000
Concrete - Class B Retaining Walls	3,540	c.y.	60.00	212,400
Concrete - Class D	370	c.y.	35.00	12,950
Reinforcing Steel	1,526,000	lb.	0.14	213,640
Test Piles - Furnish and Drive	9	each	1500.00	13,500
Piles, Precast Concrete - Furnish	42,640	l.f.	5.00	213,200
- Drive	42,640	l.f.	2.00	85,280
Structural Steel - Furnish and Erect	1,416,000	lb.	0.20	283,200

SECTION II - SECTION BETWEEN END OF TEMPORARY CONNECTIONS
AND THE NORTH PORTAL OF MIDTOWN TUNNEL - Continued

<u>Structures - Contd.</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
Miscellaneous Steel	57,900	lb.	0.40	\$ 23,160
Shear Connectors	11,800	lb.	0.50	5,900
Clean and Paint Structural Steel	14,160	cwt.	1.70	24,072
Prestressed, Precase Concrete				
Girders - Furnish and Erect	1,200	c.y.	130.00	156,000
Bridge Safety Rail	6,022	l.f.	4.50	27,099
Deck Drainage-Scuppers	11	each	90.00	990
-Headers & Fittings	1,430	l.f.	5.25	7,508
Rubber Waterstops	2,364	l.f.	2.50	5,910
Bridge Bearing Pads	115	each	40.00	4,600
				<hr/>
Subtotal				\$1,979,774

Miscellaneous Items

Freeway Lighting	Various unit pay items	\$	20,500
72" Chain Link Fence	5,700	l.f.	2.50
Gates	4	each	150.00
Sign Frames and Supports	7,800	lb.	0.40
Replace Concrete Curb	4,835	l.f.	1.75
Replace Concrete Sidewalk	12,065	s.f.	0.40
Replace Concrete Pavement Base	68,770	s.f.	0.60
Replace Asphaltic Concrete			
Wearing Surface	880	ton	7.25
			<hr/>
Subtotal			\$ 99,399

Utility Modifications

Electrical Transmission and			
Distribution Lines		l.s.	12,000
Telephone and Telegraph Lines		l.s.	700
Water Lines		l.s.	8,200
Sewer Lines		l.s.	27,700
Gas Distribution Lines		l.s.	1,200
City Street Lighting System		l.s.	8,500
			<hr/>
Subtotal			\$ 58,300

TOTAL	\$2,869,119
Legal, Administrative, and Engineering - 15%	430,000
Contingencies - 20%	574,000
	<hr/>
TOTAL CONSTRUCTION COST	\$3,873,000
Estimated Right-of-Way Cost	587,000
	<hr/>
ESTIMATED TOTAL COST - SECTION II	<u><u>\$4,460,000</u></u>

PRELIMINARY DETAILED ESTIMATE OF COST

SECTION III - MIDTOWN TUNNEL

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
<u>Grading and Drainage</u>				
Excavation for Tunnel, unclassified, Open Cut	141,270	c.y.	8.25	\$1,165,478
Roadway Drainage		l.s.		2,700
Removing Existing Pavement, Curbs, and Sidewalk	2,207	c.y.	4.00	8,828
Removing Concrete Retaining Walls, etc.	40	c.y.	16.00	640
Backfill Over Tunnel	56,780	c.y.	2.00	113,560
Subtotal				\$1,291,206

Roadway Pavement

Untreated Rock Base	1,900	ton	2.50	4,750
8" P.C. Concrete Pavement	1,180	c.y.	22.00	25,960
Concrete Curb - Type A-1	1,190	l.f.	1.75	2,082
Subtotal				\$ 32,792

Structures

Concrete - Class B	30,100	c.y.	45.00	\$1,354,500
Concrete - Class D	780	c.y.	35.00	27,300
Reinforcing Steel	6,886,500	lb.	0.14	964,110
Crushed Stone Drains	1,900	ton	4.00	7,600
Membrane Waterproofing	13,200	s.y.	3.25	42,900
Joint Seals	5,280	l.f.	3.50	18,480
Subtotal				\$2,414,890

Miscellaneous Items

Tunnel Lighting		l.s.		\$ 111,000
Emergency Telephone, Signals, and Electric Power		l.s.		15,000
Ventilation Equipment		l.s.		82,000
Vitreous Tile Lining	142,870	s.f.	2.50	357,175

SECTION III - MIDTOWN TUNNEL - Continued

<u>Miscellaneous Items - Contd.</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
Fire Protection		l.s.		8,500
72" Chain Link Fence	250	l.f.	2.50	625
Replacing Concrete Curb	1,190	l.f.	1.75	2,083
Replacing Concrete Sidewalk	9,770	s.f.	0.40	3,908
Replacing P.C. Concrete Pavement				
Base	65,000	s.f.	0.60	39,000
Replacing Asphaltic Concrete				
Wearing Surface	840	ton	7.25	6,090
Subtotal				\$ 625,381

Utility Modifications

Electrical Transmission and				
Distribution Lines		l.s.		18,500
Telephone and Telegraph Lines		l.s.		1,800
Water Lines		l.s.		16,500
Sewer Lines		l.s.		3,700
Gas Distribution Lines		l.s.		15,200
City Street Lighting		l.s.		8,500
Subtotal				\$ 64,200

TOTAL	\$4,428,469
Legal, Administrative, and Engineering - 15%	664,000
Contingencies - 20%	886,000
TOTAL CONSTRUCTION COST	\$5,978,000
Estimated Right-of-Way Cost	177,000
ESTIMATED TOTAL COST - SECTION III	<u>\$6,155,000</u>

PRELIMINARY DETAILED ESTIMATE OF COST

SECTION IV - SOUTH PORTAL OF MIDTOWN TUNNEL TO CONNECTION WITH SOUTHERN FREEWAY

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
<u>Grading and Drainage</u>				
Clearing and Grubbing	24	acre	750.00	\$ 18,000
Roadway Excavation, unclassified	636,200	c.y.	1.00	636,200
Roadway Drainage		l.s.		40,060
Removing Existing Pavement, Curb, and Sidewalk	3,027	c.y.	4.00	12,108
Removing Concrete Retaining Walls, Bridge, etc.	11,780	c.y.	16.00	188,480
Ditch Paving	9,900	l.f.	0.40	3,960
Landscaping		l.s.		20,000
				<hr/>
Subtotal				\$ 918,808

Roadway Paving

12" Untreated Rock Subbase	36,050	ton	2.50	\$ 90,125
8" P.C. Concrete Pavement Base	6,760	c.y.	22.00	148,720
Asphalt Concrete Wearing Surface	6,410	ton	7.25	46,473
Concrete Curb - Type A-1	3,755	l.f.	1.75	6,571
Concrete Curb & Gutter - Type A-2	13,656	l.f.	2.25	30,726
Bituminous Concrete Dike	5,010	l.f.	0.25	1,253
Metal Plate Guard Rail	4,550	l.f.	7.00	31,850
				<hr/>
Subtotal				\$ 355,718

Structures

Structural Excavation	16,460	c.y.	3.75	\$ 61,725
Structural Backfill	14,670	c.y.	2.75	40,342
Crushed Stone Drains	1,010	ton	4.00	4,040
Concrete - Class B Superstructure	12,600	c.y.	65.00	819,000
Concrete - Class B Substructure	12,640	c.y.	60.00	758,400
Concrete - Class BI Retaining Walls	2,050	c.y.	60.00	123,000
Reinforcing Steel	4,436,000	lb.	0.14	621,040
Test Piles - Furnish and Drive	6	each	1,500.00	9,000
Piles, Precast Concrete - Furnish	53,600	l.f.	5.00	268,000
- Drive	53,600	l.f.	2.00	107,200
Metal Bridge Hand Rail	970	l.f.	20.00	19,400
Bridge Safety Railing	12,520	l.f.	4.50	56,340
Structural Steel Bents	43,600	lb.	0.22	9,592

SECTION IV - SOUTH PORTAL OF MIDTOWN TUNNEL TO
CONNECTION WITH SOUTHERN FREEWAY - Continued

<u>Structures - Contd.</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
Structural Steel	147,200	lb.	0.20	\$ 29,440
Miscellaneous Steel	167,700	lb.	0.40	67,080
Clean and Paint Structural Steel	1,910	cwt.	1.70	3,247
Prestressed, Precast Concrete Girders - Furnish and Erect	4,100	c.y.	130.00	533,000
Deck Drainage - Scuppers	31	each	90.00	2,790
- Header and Fittings	2,345	l.f.	5.25	12,311
Rubber Waterstops	6,180	l.f.	2.50	15,450
Bridge Bearing Pads	420	each	40.00	16,800
Subtotal				\$3,577,197 *

Miscellaneous Items

Freeway Lighting	Various unit pay items			\$ 57,600
72" Chain Link Fence	25,900	l.f.	2.50	64,750
Gates	16	each	150.00	2,400
Sign Frames and Supports	12,000	lb.	0.40	4,800
Replace Concrete Curb	3,755	l.f.	1.75	6,571
Replace Concrete Sidewalk	14,060	s.f.	0.40	5,624
Replace P.C. Concrete Pavement				
Base	52,600	s.f.	0.60	31,560
Replace Bituminous Concrete				
Wearing Surface	680	ton	7.25	4,930
New Concrete Sidewalk	13,240	s.f.	0.40	5,296
Traffic Signals	Various unit pay items			9,200
Subtotal				\$ 192,731

Utility Modifications

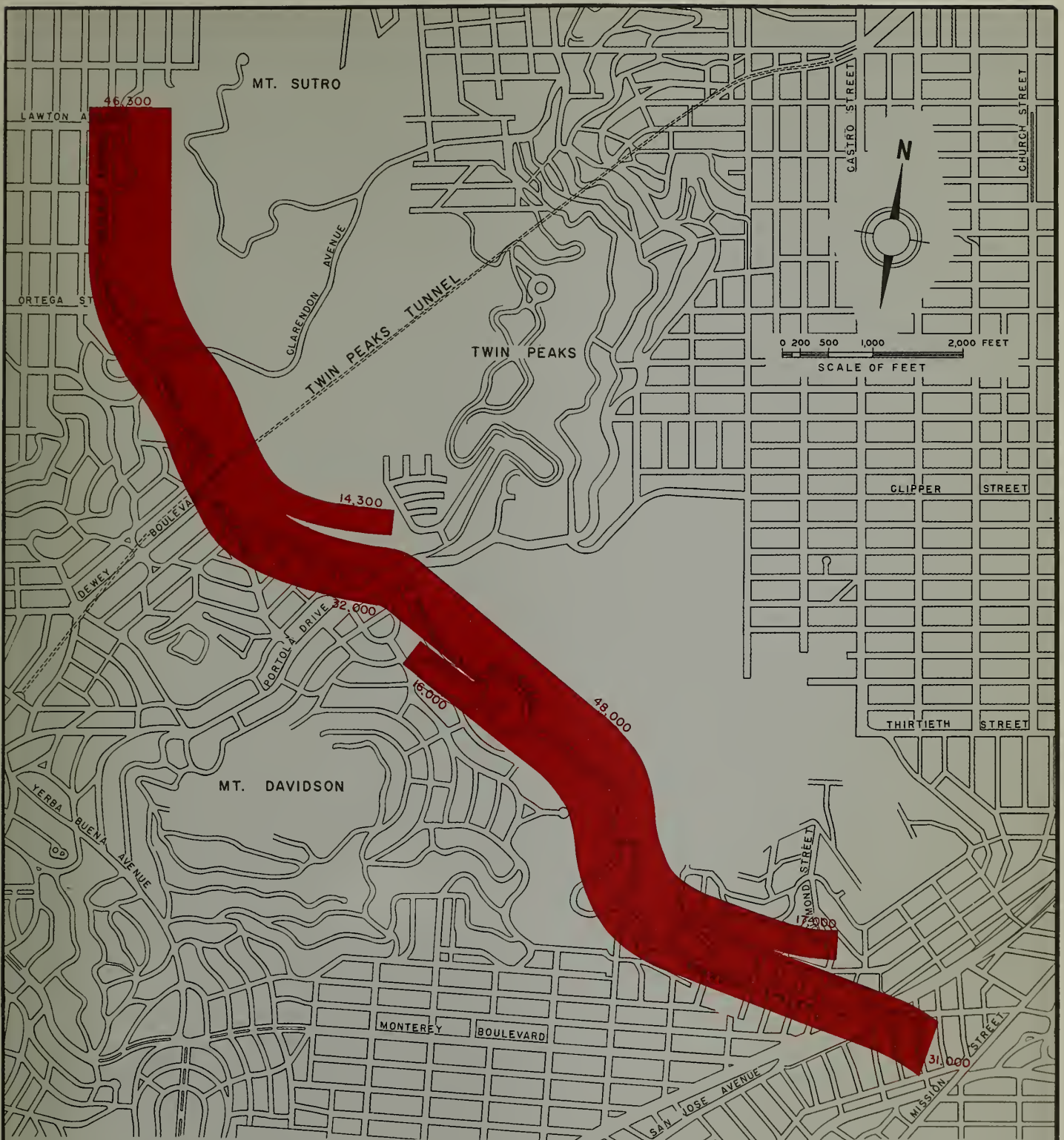
Telephone and Telegraph Lines	l.s.	\$ 1,000
Water Lines	l.s.	64,800
Sewer Lines	l.s.	112,800
Gas Distribution Lines	l.s.	33,400
City Street Lighting	l.s.	9,500
Subtotal		\$ 221,500

TOTAL	\$5,265,954 *
Legal, Administrative, and Engineering - 15%	788,000
Contingencies - 20%	1,053,000
TOTAL CONSTRUCTION COST	\$7,107,000 *
Estimated Right-of-Way Cost	2,039,000
ESTIMATED TOTAL COST - SECTION IV	\$9,146,000 *

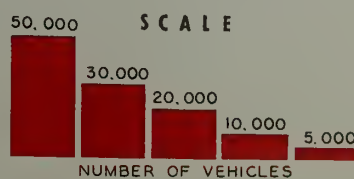
*See note page 25.

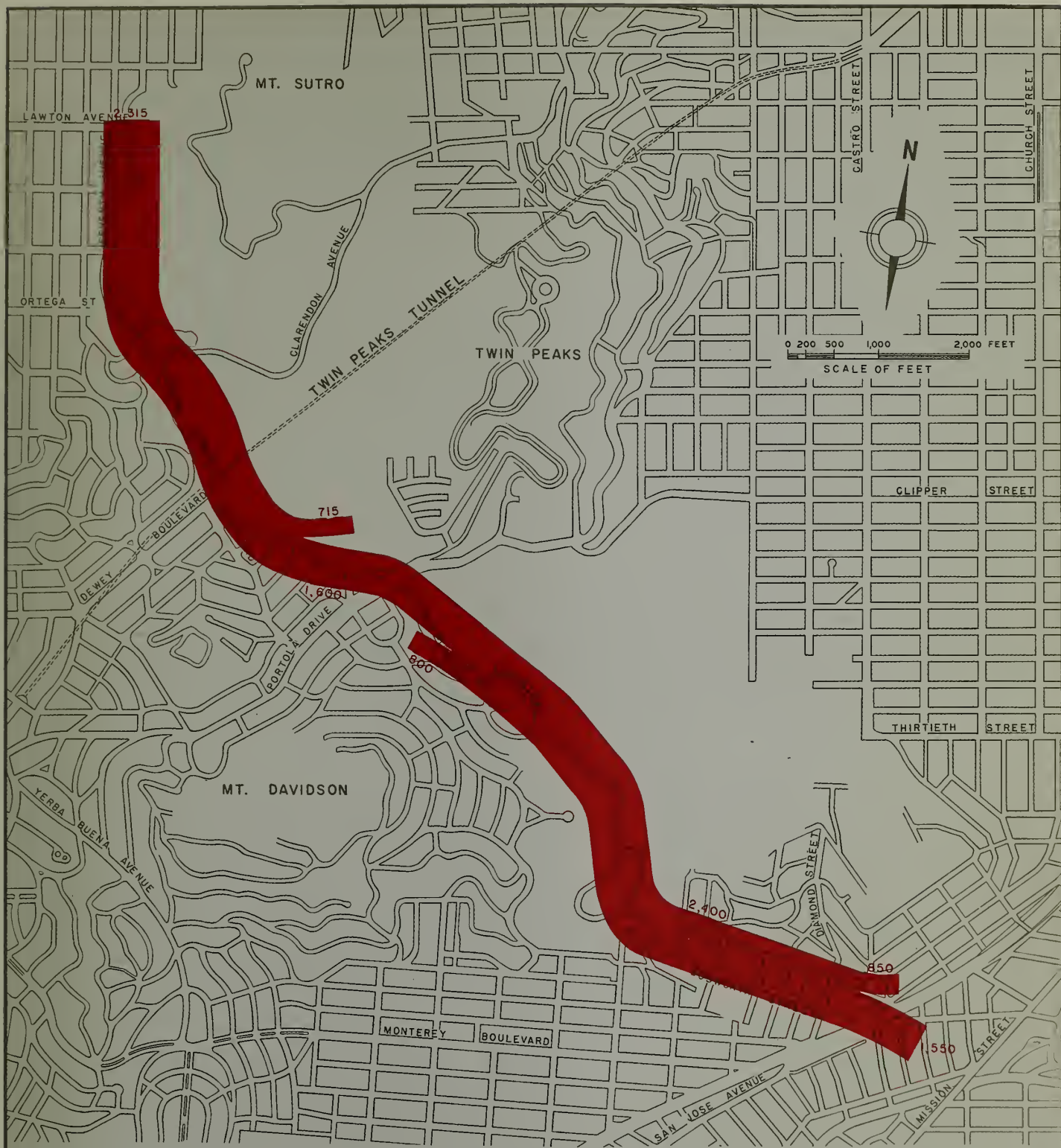


1980 SAN FRANCISCO FREEWAY NETWORK ASSUMED IN THIS STUDY

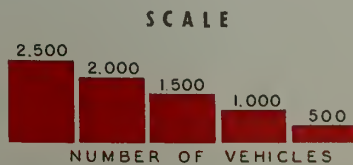


ESTIMATED 1980 AVERAGE
DAILY TRAFFIC DEMAND
ON CROSSTOWN FREEWAY



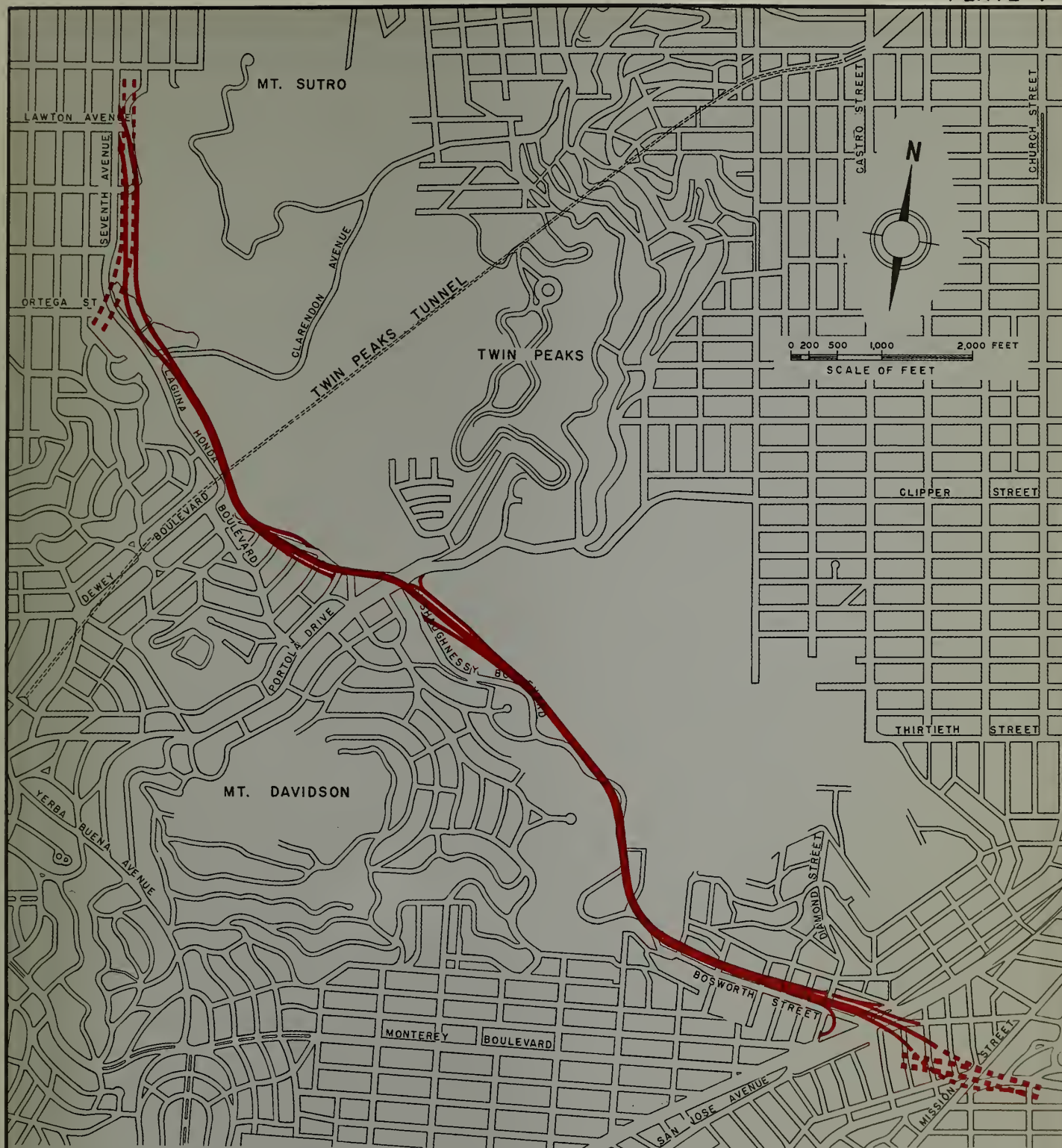


ESTIMATED 1980 ONE-WAY
PEAK-HOUR TRAFFIC DEMAND
ON CROSSTOWN FREEWAY





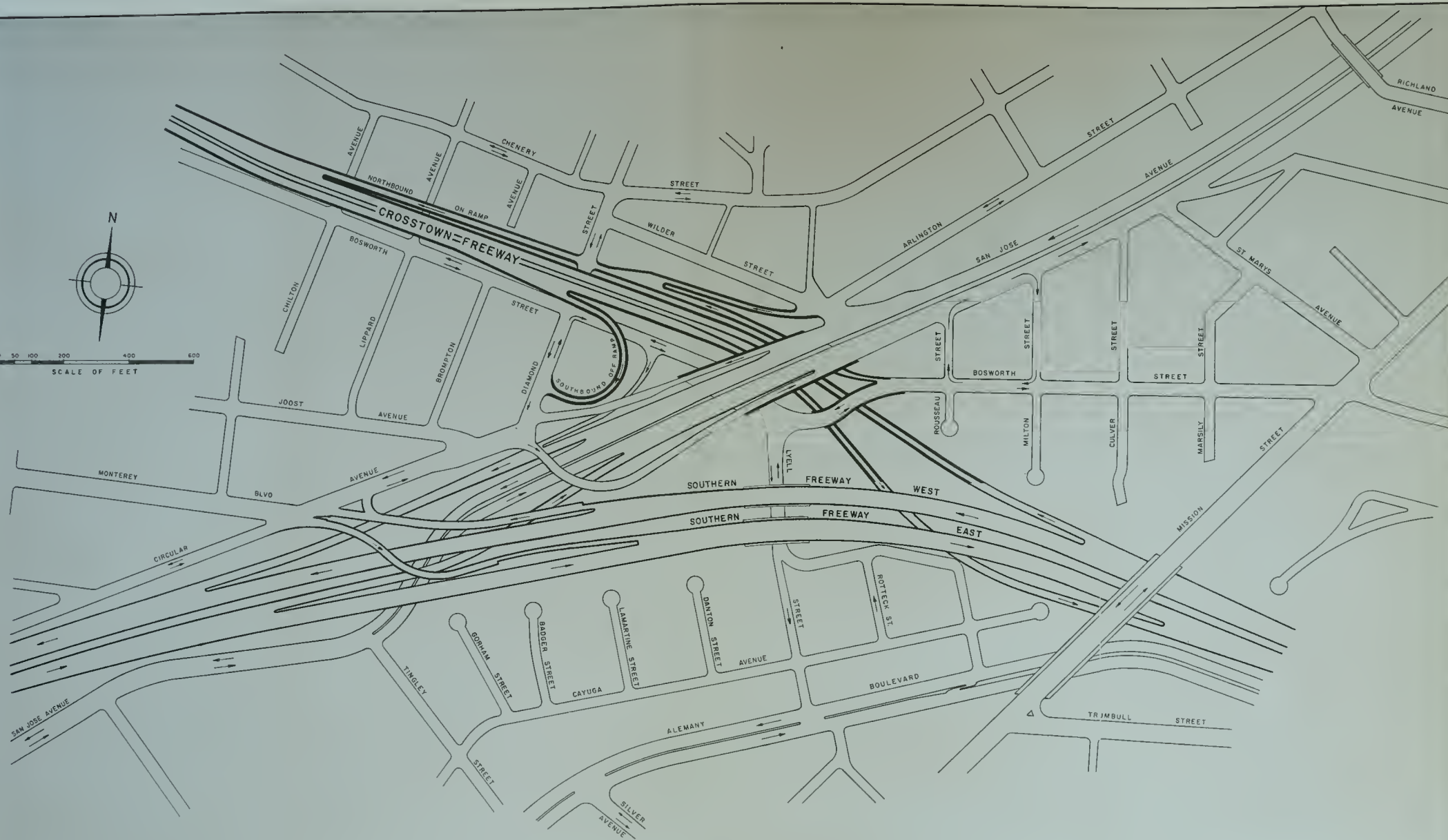
LOCATION PLAN OF ALTERNATE ROUTES STUDIED



RECOMMENDED LOCATION OF CROSTOWN FREEWAY

LEGEND

- CROSTOWN FREEWAY
- - - - - FREEWAYS AND CONNECTIONS BY OTHERS



PROPOSED FREEWAY CONNECTIONS IN VICINITY OF SAN JOSE AVENUE

LEGEND

- CROSSTOWN FREEWAY PROJECT
- SOUTHERN FREEWAY PROJECT

A P P E N D I X

A P P E N D I X

LIST OF PLANS

Drawing Number	Sheet Number	Title
G-1	1	Vicinity Map and List of Drawings
R-1	2	Plan and Profile - Seventh Avenue to Station 53+85
R-2	3	Plan and Profile - Station "A" 49+00 to Station "A" 66+61.26
R-3	4	Plan and Profile - Station 53+85 to Station 85+12
R-4	5	Plan and Profile - Station 85+12 to Station 115+12
R-5	6	Plan and Profile - Station 115+12 to Station 145+25
R-6	7	Plan and Profile - Station 145+25 to Station 176+60
R-7	8	Plan and Profile - Southbound Interchange with Southern Freeway - Station 176+60 to Station 185+29.75
R-8	9	Plan and Profile - Northbound Interchange with Southern Freeway - Station "B" 177+00.43 to Station 187+52
R-9	10	Typical Roadway Sections
R-10	11	Miscellaneous Typical Details
R-11	12	Location of Test Borings - Station "A" 35+80 to Station 120+00
R-12	13	Location of Test Borings - Station 120+00 to Station "B" 187+52
R-13	14	Logs of Test Borings
R/W-1	15	Rights-of-Way - Station "A" 35+80 to Station 54+40
R/W-2	16	Rights-of-Way - Station 54+40 to Station 85+16
R/W-3	17	Rights-of-Way - Station 85+16 to Station 115+12
R/W-4	18	Rights-of-Way - Station 115+12 to Station 145+24
R/W-5	19	Rights-of-Way - Station 145+24 to Station 176+62
R/W-6	20	Rights-of-Way - Station 176+62 to Station "B" 187+52

A P P E N D I X - Continued

Drawing Number	Sheet Number	Title
U-1	21	Modifications to Sewer Lines - Station "A" 35+80 to Station 53+85
U-2	22	Modifications to Sewer Lines - Station 53+85 to Station 85+03
U-3	23	Modifications to Sewer Lines - Station 85+03 to Station 115+12
U-4	24	Modifications to Sewer Lines - Station 115+12 to Station 145+25
U-5	25	Modifications to Sewer Lines - Station 145+25 to Station 176+60
U-6	26	Modifications to Sewer Lines - Station 176+60 to Station "B" 187+52
U-7	27	Typical Drainage Details
U-8	28	Modifications to Water Distribution Lines - Station 55+00 to Station 85+10
U-9	29	Modifications to Water Distribution Lines - Station 85+10 to Station 115+10
U-10	30	Modifications to Water Distribution Lines - Station 145+25 to Station 176+60
U-11	31	Modifications to Water Distribution Lines - Station 176+60 to Station "B" 187+52
U-12	32	Modifications to Gas Distribution Lines - Station 55+00 to Station 85+12
U-13	33	Modifications to Gas Distribution Lines - Station 85+12 to Station 115+12
U-14	34	Modifications to Gas Distribution Lines - Station 145+63 to Station 176+60
U-15	35	Modifications to Gas Distribution Lines - Station 176+60 to Station "B" 187+52
U-16	36	Electric Plan - Station "A" 35+80 to Station 54+45
U-17	37	Electric Plan - Station 54+45 to Station 85+12

A P P E N D I X - Continued

Drawing Number	Sheet Number	Title
U-18	38	Electric Plan - Station 85+12 to Station 115+12
U-19	39	Electric Plan - Station 115+12 to Station 145+24
U-20	40	Electric Plan - Station 145+24 to Station 176+60
U-21	41	Electric Plan - Station 176+60 to Station "B"187+52
U-22	42	Freeway Lighting Details
U-23	43	Electrical Details
S-1	44	Viaduct Over Laguna Honda Reservoir - Typical Section and Elevation
S-2	45	Bridge Over Entrance Road to Laguna Honda Home - Plan, Elevation, and Section
S-3	46	Bridge Over Woodside Avenue - Plan, Elevation, and Section
S-4	47	Tunnel Under Portola Drive - Plan and Profile
S-5	48	Tunnel Under Portola Drive - Typical Sections
S-6	49	Bosworth Street Viaduct - Typical Section and Elevation - Crossing of Bosworth Street
S-7	50	Bosworth Street Viaduct - Typical Section and Elevation - Three Column Bent
S-8	51	San Jose Avenue Bridge Over Freeway - Plan, Elevation, and Sections
S-9	52	Ramp Structure - Typical Section and Elevation
S-10	53	Abutments - Plans, Elevations, and Sections
S-11	54	Superstructure Details
S-12	55	Miscellaneous Structural Details
S-13	56	Retaining Walls - Typical Sections
S-14	57	New Bosworth Street Bridge Over Freeway - Plan, Elevation, and Sections



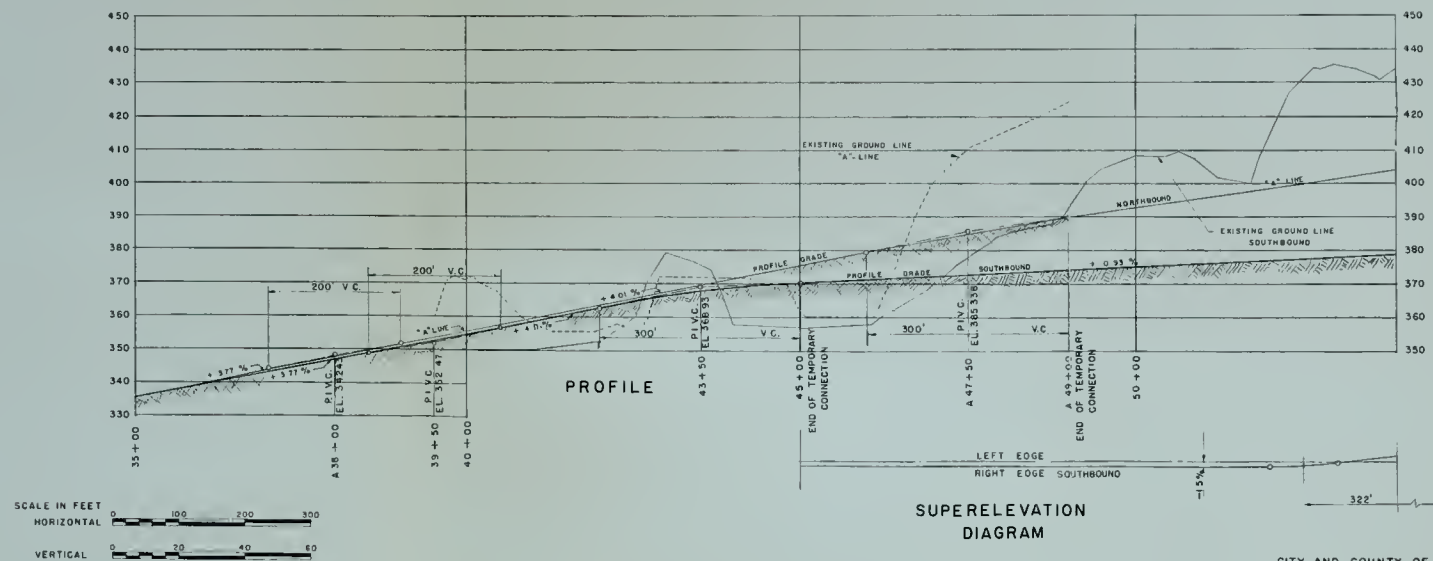
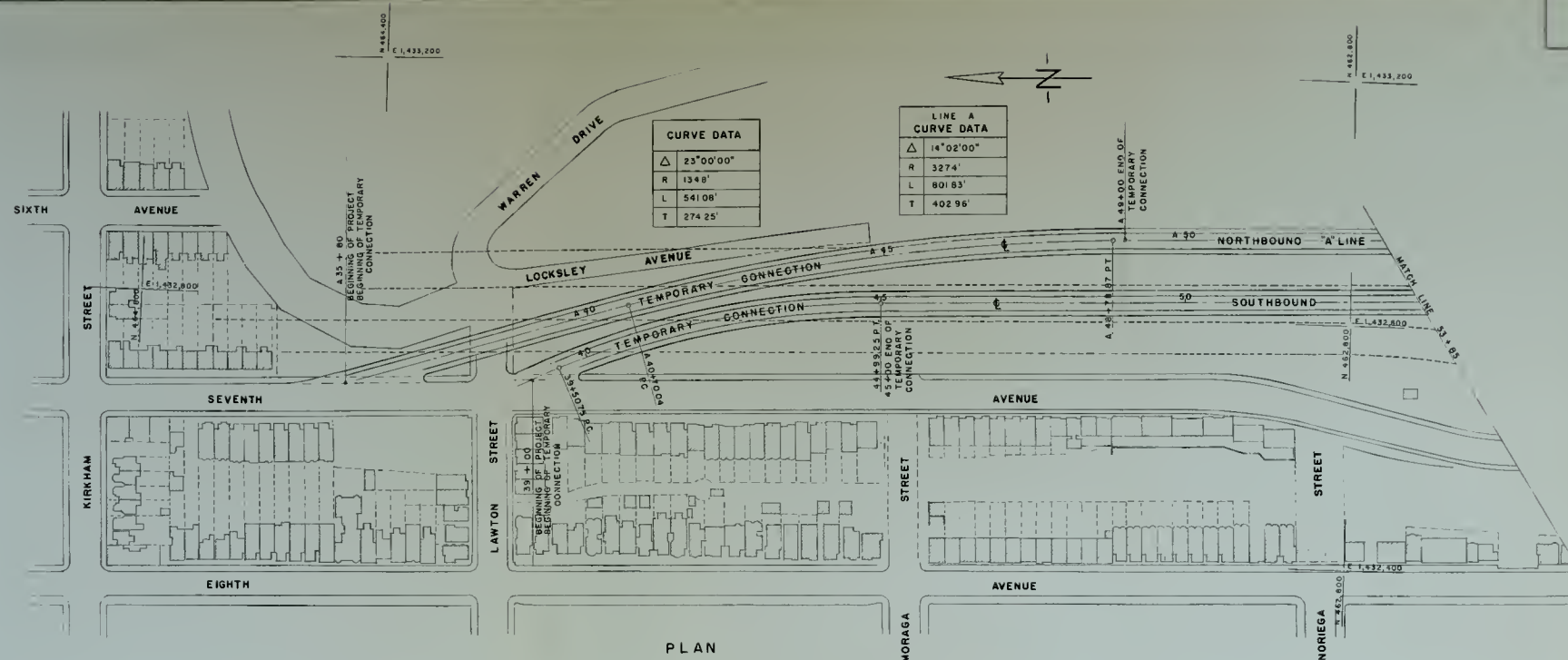
LIST OF DRAWINGS

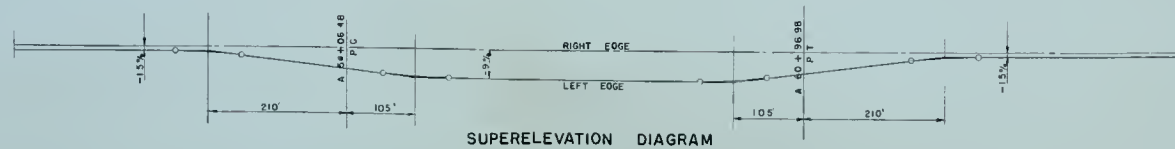
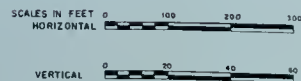
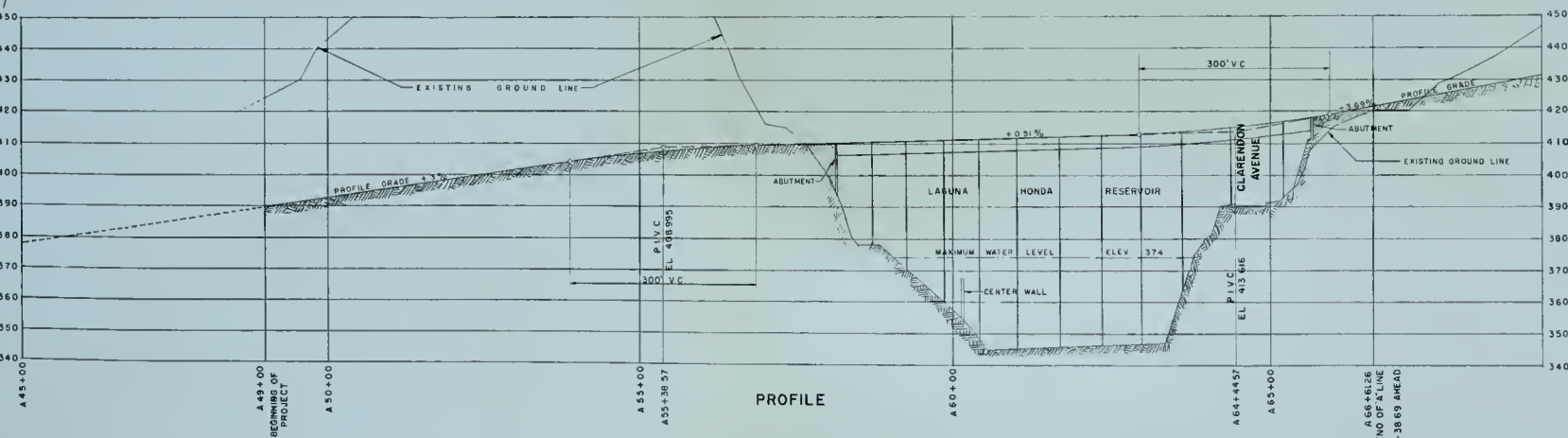
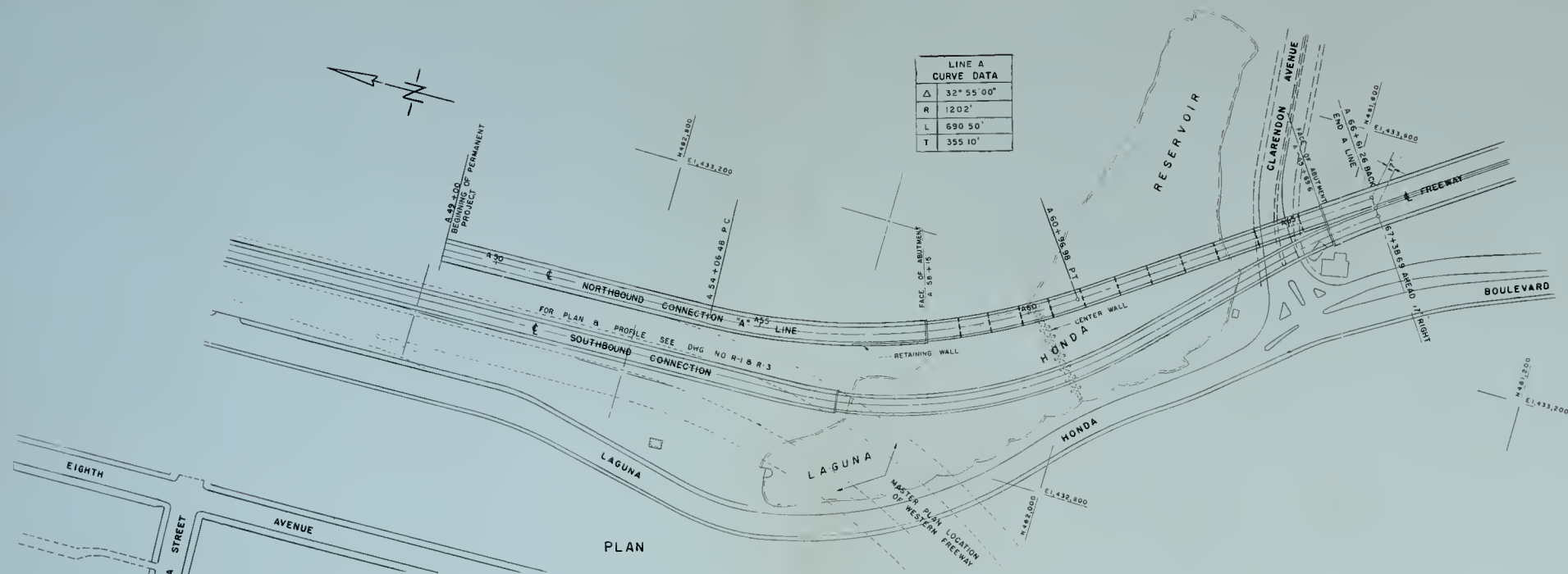
DRAWING NO.	SHEET NO.	TITLE
G-1	1	VICINITY MAP AND LIST OF DRAWINGS
R-1	2	PLAN AND PROFILE - SEVENTH AVENUE TO STATION 53+BS
R-2	3	" - STATION "A"49+00 TO STATION "A"66+61.26
R-3	4	" - STATION 53+BS TO STATION BS+12
R-4	5	" - STATION BS+12 TO STATION 115+12
R-5	6	" - STATION 115+12 TO STATION 145+25
R-6	7	" - STATION 145+25 TO STATION 176+60
R-7	8	" - SOUTHBOUND INTERCHANGE WITH SOUTHERN FREEWAY STATION 176+60 TO STATION 186+28
R-B	9	" - NORTHBOUND INTERCHANGE WITH SOUTHERN FREEWAY STATION "B"177+00.43 TO STATION "B"187+77
R-9	10	TYPICAL ROADWAY SECTIONS
R-10	11	MISCELLANEOUS DETAILS
R-11	12	LOCATION OF TEST BORINGS - STATION "A"35+80 TO STATION 120+00
R-12	13	" - STATION 120+00 TO STATION "B"187+77
R-13	14	LOGS OF TEST BORINGS
R/W-1	15	RIGHTS-OF-WAY - STATION "A"35+80 TO STATION 54+40
R/W-2	16	" - STATION 54+40 TO STATION 85+16
R/W-3	17	" - STATION 85+16 TO STATION 115+12
R/W-4	18	" - STATION 115+12 TO STATION 145+24
R/W-5	19	" - STATION 145+24 TO STATION 176+62
R/W-6	20	" - STATION 176+62 TO STATION "B"187+77
U-1	21	MODIFICATIONS TO SEWER LINES - STATION "A"35+80 TO STATION 53+BS
U-2	22	" - STATION 53+BS TO STATION BS+03
U-3	23	" - STATION BS+03 TO STATION 115+12
U-4	24	" - STATION 115+12 TO STATION 145+25
U-5	25	" - STATION 145+25 TO STATION 176+60
U-6	26	" - STATION 176+60 TO STATION "B"187+77
U-7	27	TYPICAL DRAINAGE DETAILS
U-8	28	MODIFICATIONS TO WATER DISTRIBUTION LINES - STATION 55+00 TO STATION BS+10
U-9	29	" - STATION BS+10 TO STATION 115+10
U-10	30	" - STATION 145+25 TO STATION 176+60
U-11	31	" - STATION 176+60 TO STATION "B"187+87
U-12	32	MODIFICATIONS TO GAS DISTRIBUTION LINES - STATION 55+00 TO STATION BS+12
U-13	33	" - STATION BS+12 TO STATION 115+12
U-14	34	" - STATION 145+63 TO STATION 176+60
U-15	35	" - STATION 176+60 TO STATION "B"187+77
U-16	36	ELECTRIC PLAN - STATION "A"35+80 TO STATION 54+45
U-17	37	" - STATION 54+45 TO STATION BS+12
U-18	38	" - STATION BS+12 TO STATION 115+12
U-19	39	" - STATION 115+12 TO STATION 145+24
U-20	40	" - STATION 145+24 TO STATION 176+60
U-21	41	" - STATION 176+60 TO STATION "B"187+77
U-22	42	FREEWAY LIGHTING DETAILS
U-23	43	ELECTRICAL DETAILS
S-1	44	VIADUCT OVER LAGUNA HONDA RESERVOIR - TYPICAL SECTION AND ELEVATION
S-2	45	BRIDGE OVER ENTRANCE ROAD TO LAGUNA HONDA HOME - PLAN, ELEVATION, AND SECTION
S-3	46	BRIDGE OVER WOODSIDE AVENUE - PLAN, ELEVATION, AND SECTION
S-4	47	TUNNEL UNDER PORTOLA DRIVE - PLAN AND PROFILE
S-5	48	" - TYPICAL SECTIONS
S-6	49	BOSWORTH STREET VIADUCT - TYPICAL SECTION AND ELEVATION - CROSSING OF BOSWORTH STREET
S-7	50	" - THREE COLUMN BENT
S-8	51	SAN JOSE AVENUE BRIDGE OVER FREEWAY - PLAN, ELEVATION, AND SECTIONS
S-9	52	RAMP STRUCTURE - TYPICAL SECTION AND ELEVATION
S-10	53	ABUTMENTS - PLANS, ELEVATIONS, AND SECTIONS
S-11	54	SUPERSTRUCTURE DETAILS
S-12	55	MISCELLANEOUS STRUCTURAL DETAILS
S-13	56	RETAINING WALLS - TYPICAL SECTIONS
S-14	57	BOSWORTH STREET BRIDGE OVER FREEWAY - PLAN, ELEVATION, AND SECTIONS

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

CROSTOWN FREEWAY VICINITY MAP AND LIST OF DRAWINGS

JANUARY 1958 DWG. NO. G-1
DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

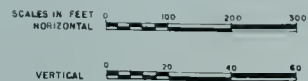
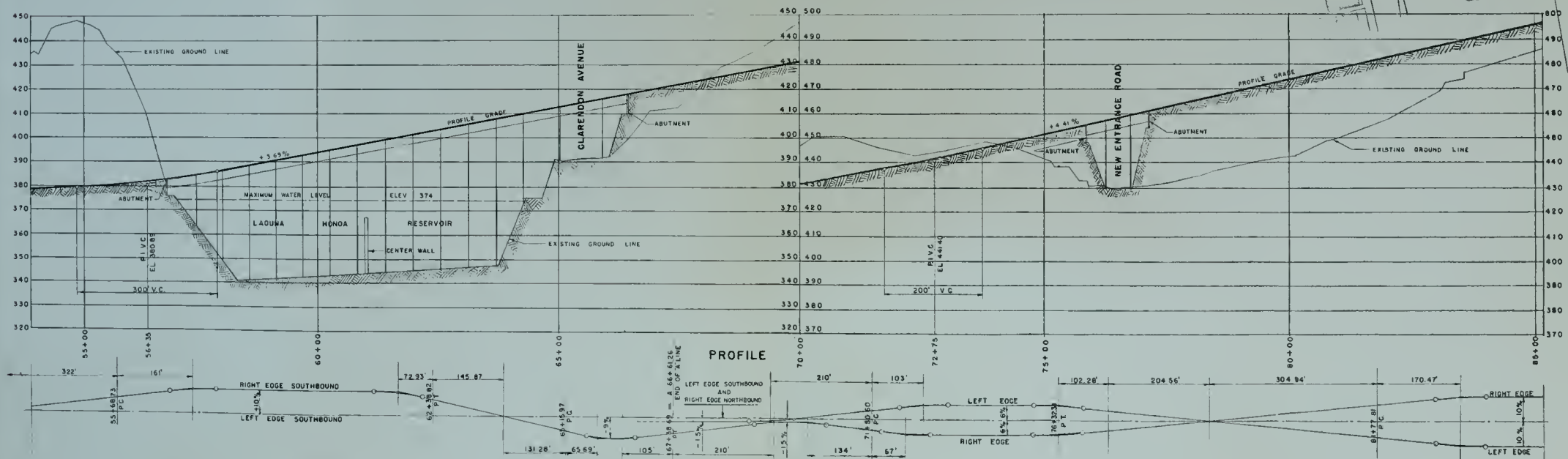
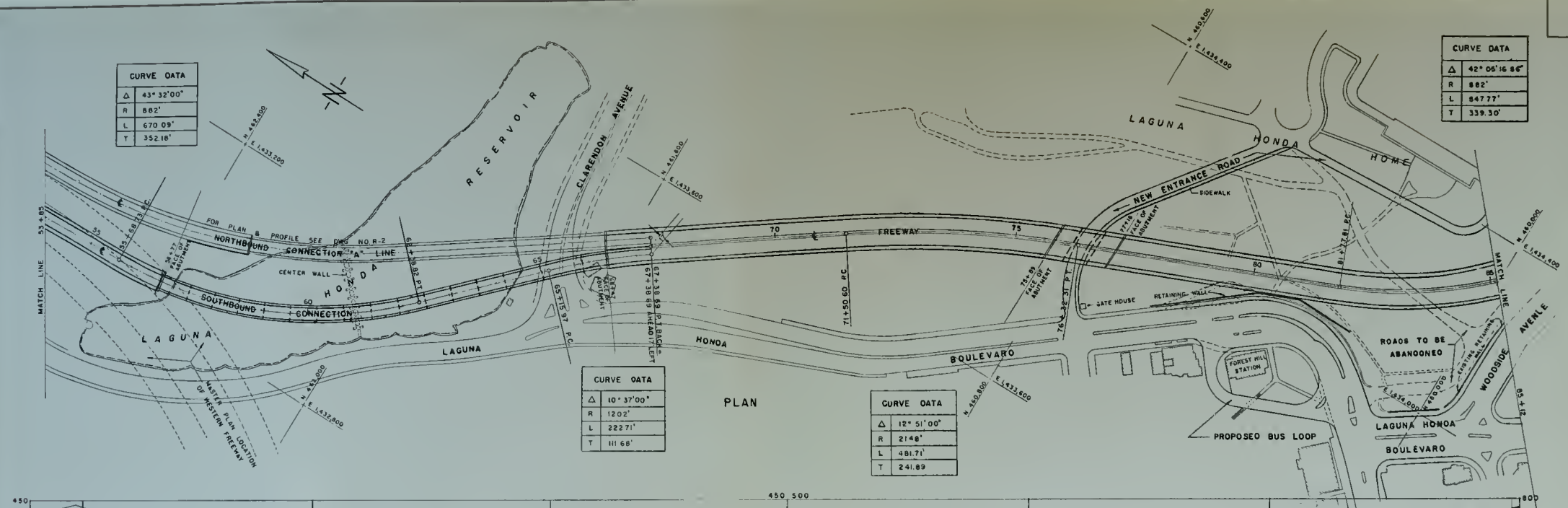




CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

PLAN AND PROFILE
STATION "A" 49+00 TO STATION "A" 66+61.26

AUGUST 1957
DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

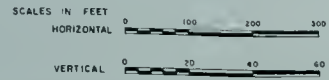
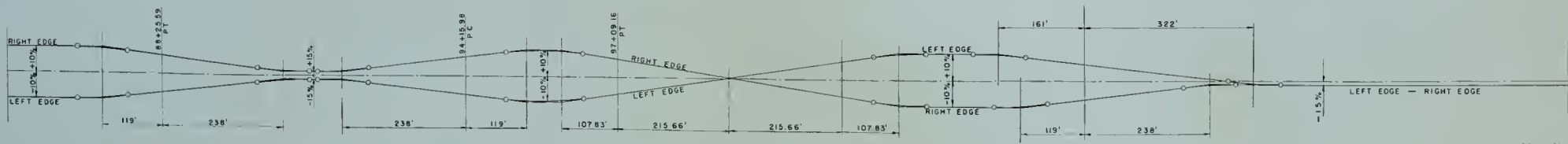
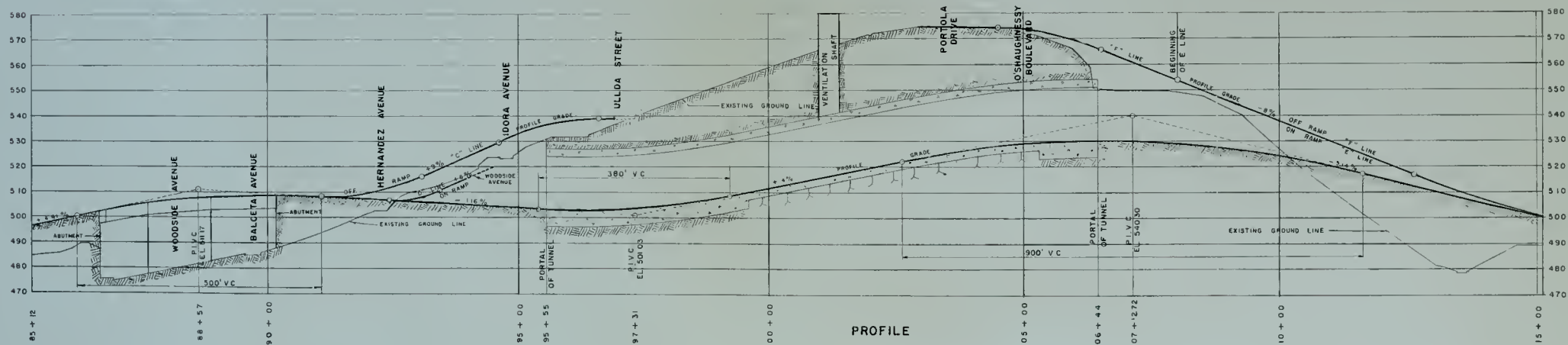
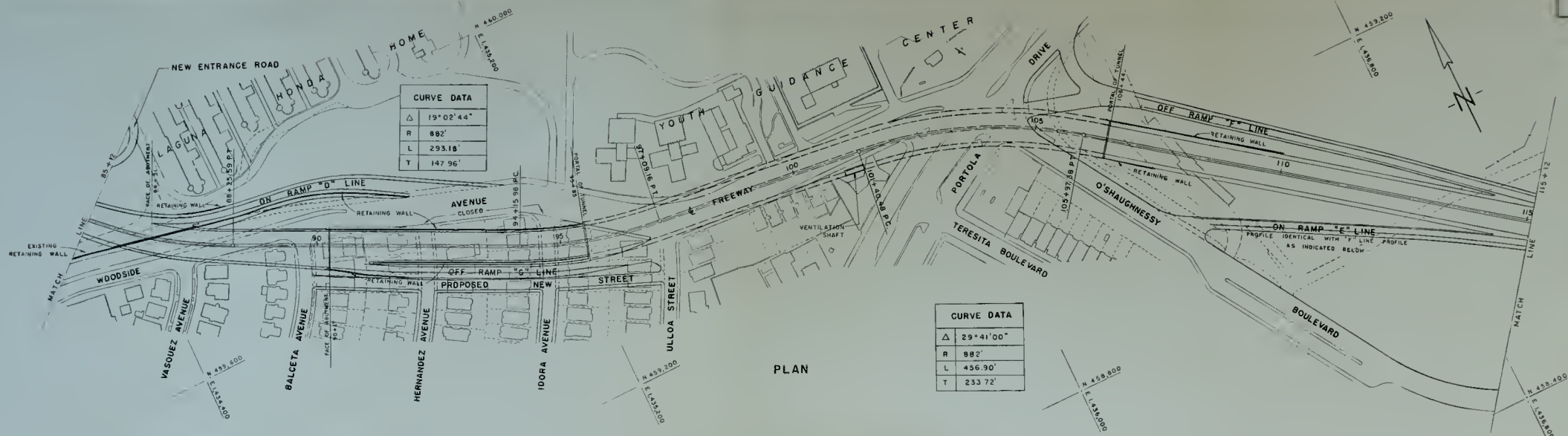


SUPERELEVATION DIAGRAM

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

PLAN AND PROFILE
STATION 53+85 TO STATION 85+12

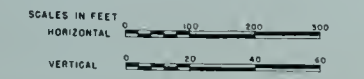
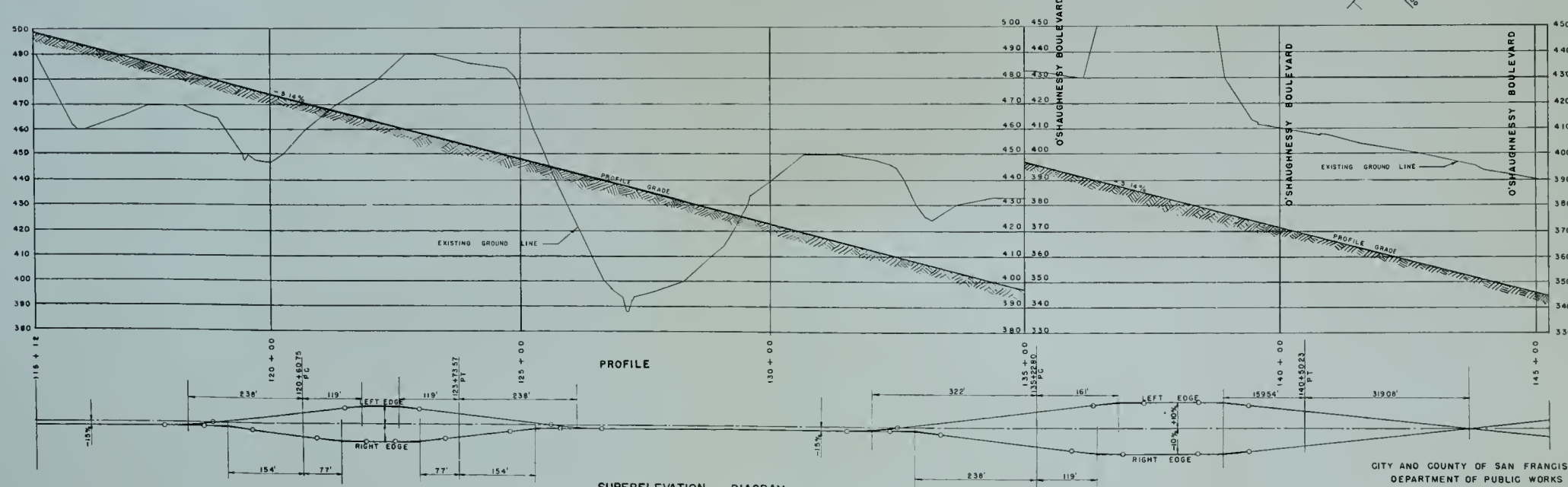
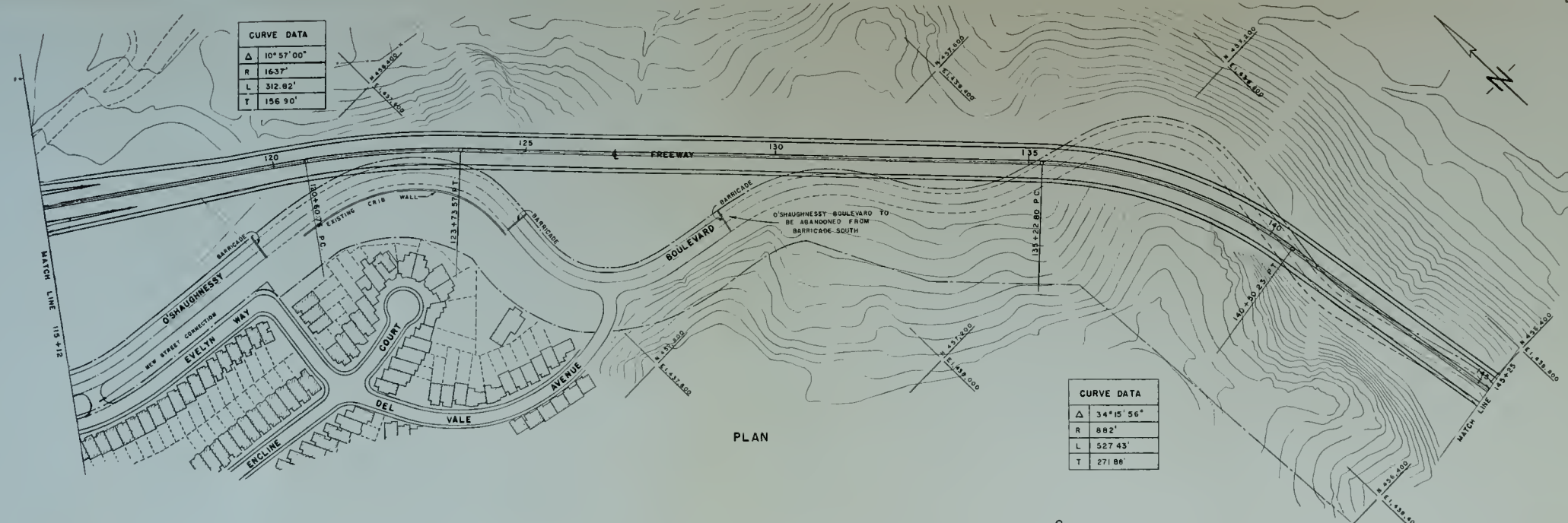
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OWG NO R-3
DE LEUW, CATHEN & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



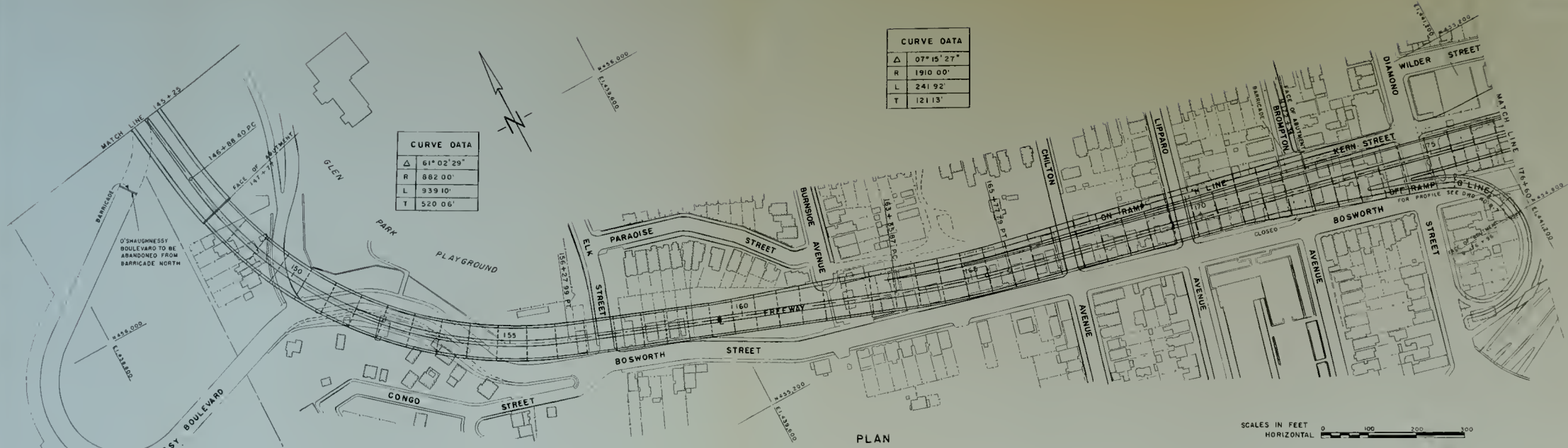
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

PLAN AND PROFILE
STATION 85+12 TO STATION 115+12

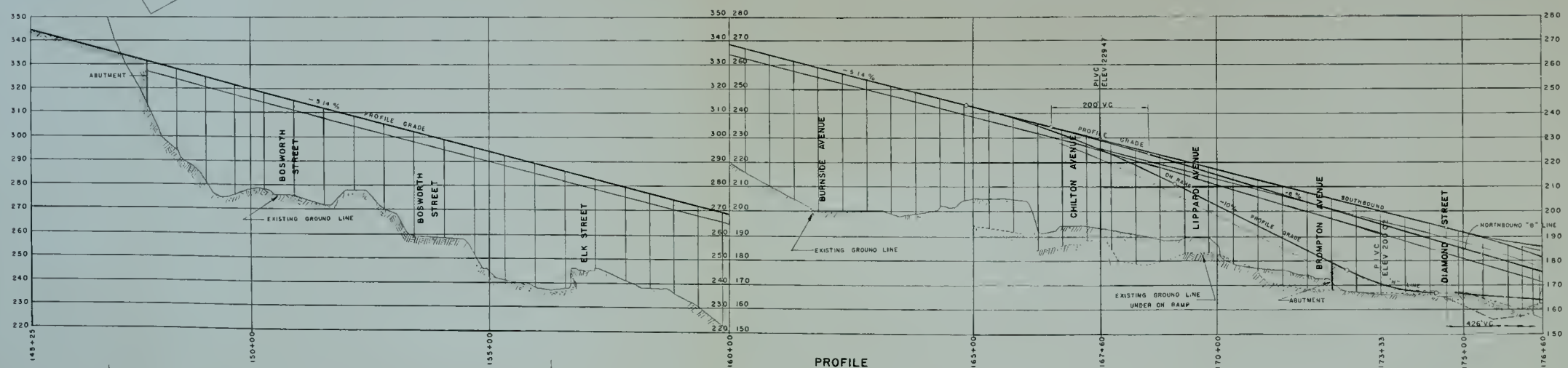
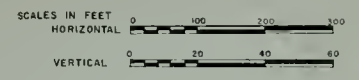
AUGUST 1957
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DWG NO. R-4



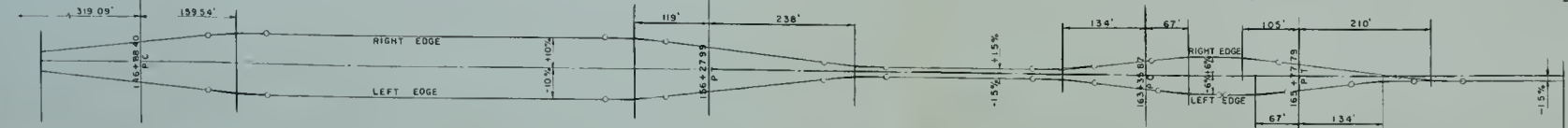
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
PLAN AND PROFILE
STATION 115 + 12 TO STATION 145 + 25
AUGUST 1957 OWG NO R-5
DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



PLAN



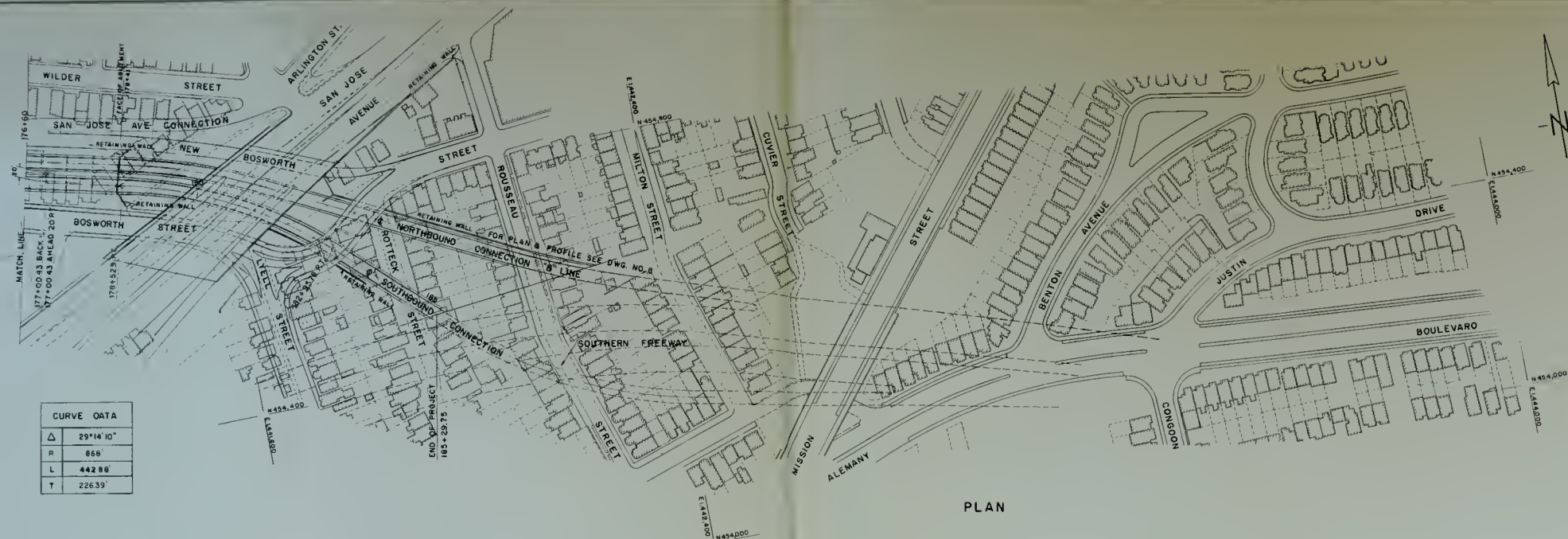
PROFILE



SUPERELEVATION DIAGRAM

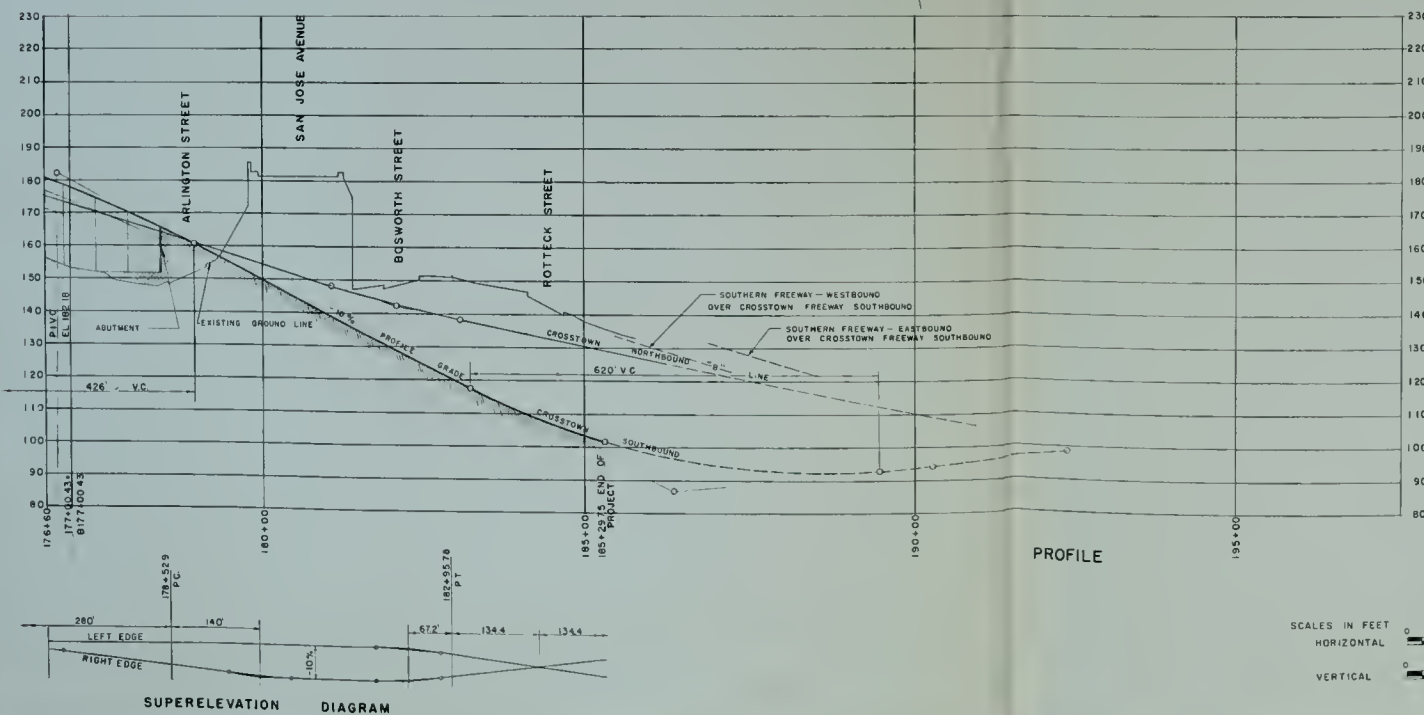
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

PLAN AND PROFILE
STATION 145+25 TO STATION 176+60

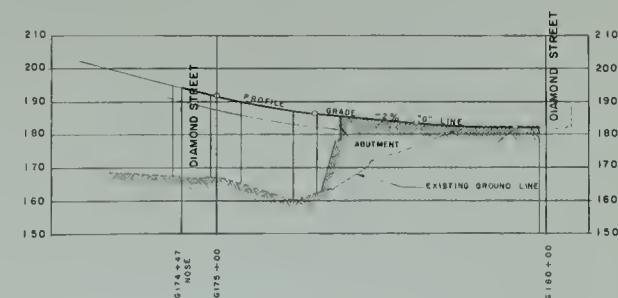


PLAN

CURVE DATA	
Δ	29°14'10"
R	868'
L	442.88'
T	226.39'

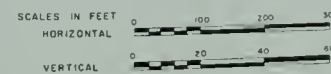


PROFILE



SOUTHBOUND OFF RAMP TO DIAMOND STREET

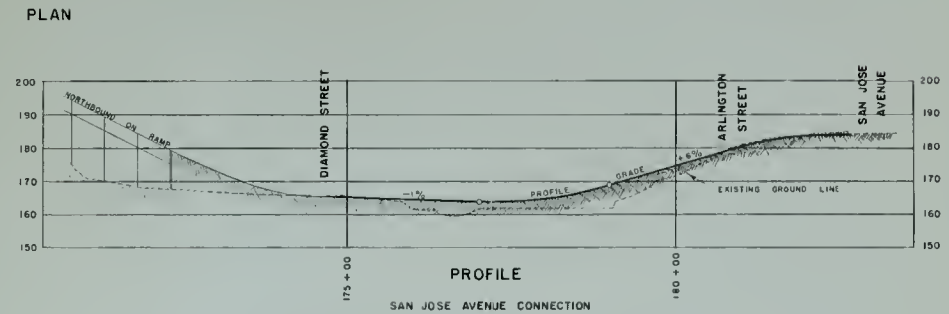
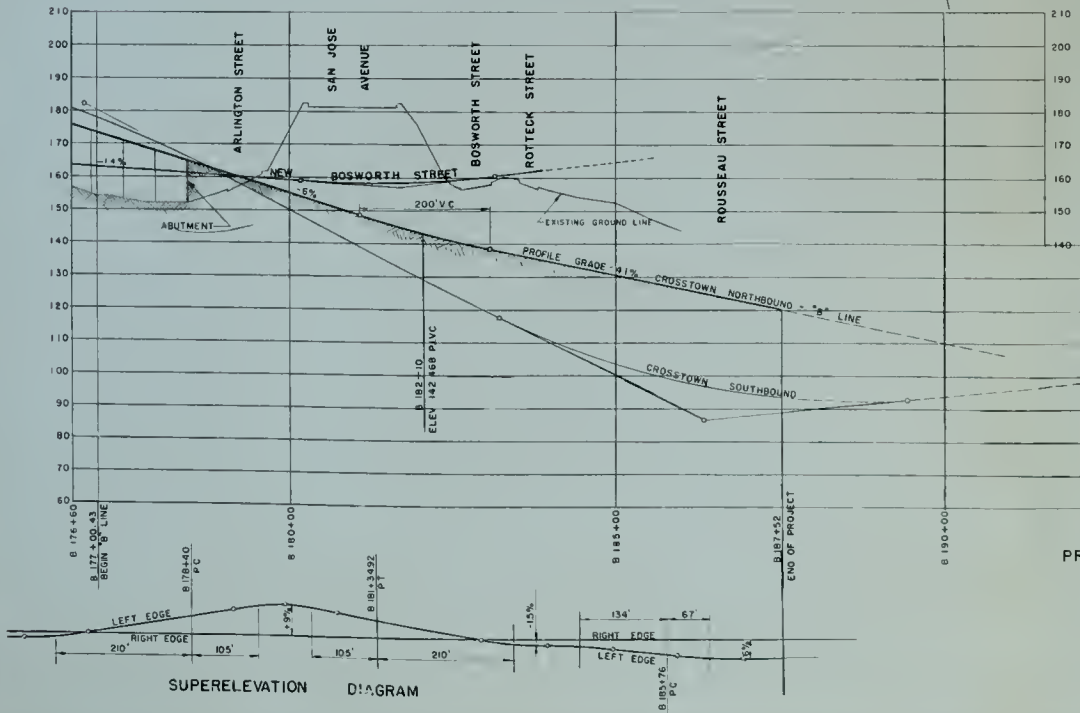
FOR PLAN SEE DWG. NO R-6



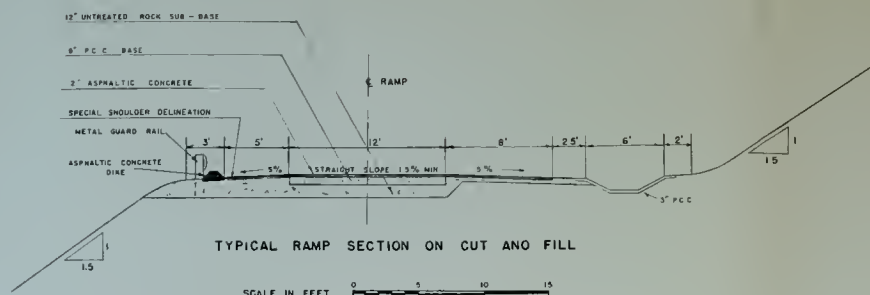
CITY AND COUNTY OF SAN FRANCISCO
 DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
 PLAN AND PROFILE
 SOUTHBOUND INTERCHANGE WITH SOUTHERN FREEWAY
 STATION 176+60 TO STATION 185+29.75
 JANUARY 1958 DWG NO R-7
 DE LEUW, CATHER & COMPANY CONSULTING ENGINEERS SAN FRANCISCO



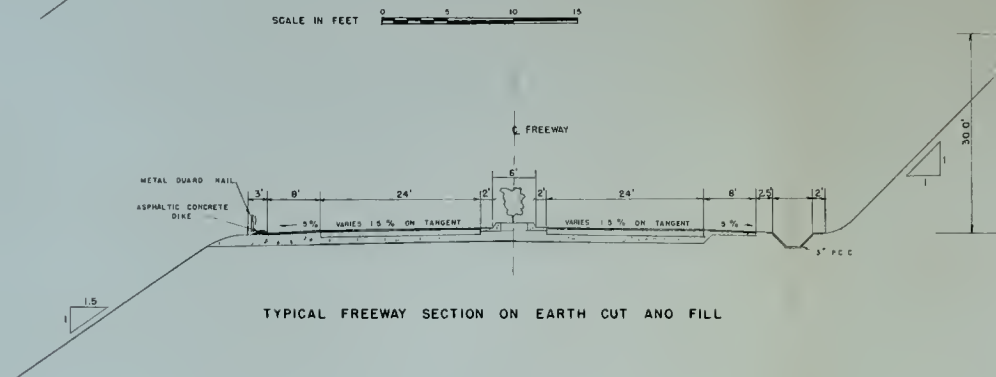
LINE B CURVE DATA	
Δ	13°56'35"
R	1212'
L	294.92'
T	148.19'



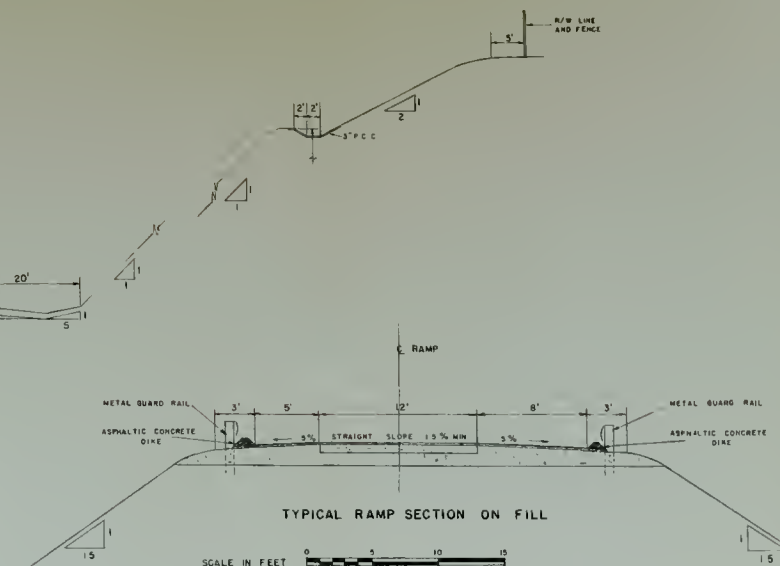
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
PLAN AND PROFILE
NORTHBOUND INTERCHANGE WITH SOUTHERN FREEWAY
STATION "R" 177+00.43 TO STATION "B" 187+52
JANUARY 1958
DE LEUV, GATHER & COMPANY CONSULTING ENGINEERS - SAN FRANCISCO



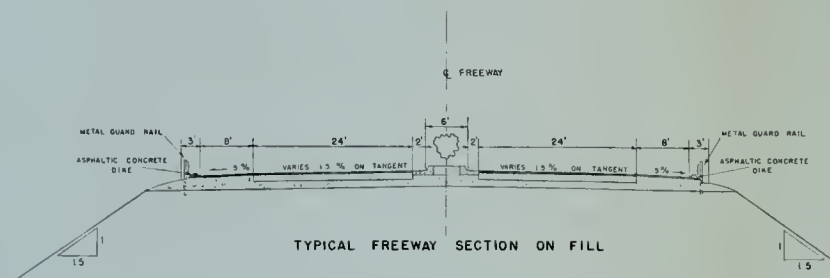
TYPICAL RAMP SECTION ON CUT AND FILL



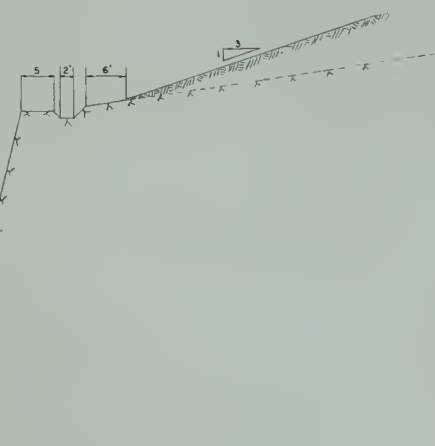
TYPICAL FREEWAY SECTION ON EARTH CUT AND FILL



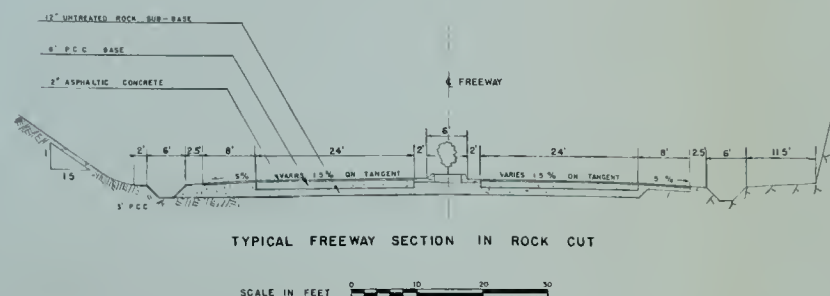
TYPICAL RAMP SECTION ON FILL



TYPICAL FREEWAY SECTION ON FILL



TYPICAL CENTER MALL SECTION ON CURVES



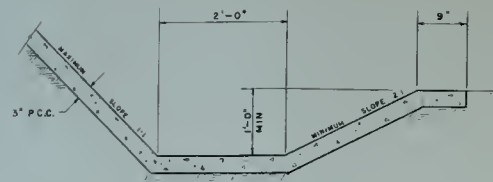
TYPICAL FREEWAY SECTION IN ROCK CUT

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

TYPICAL ROADWAY SECTIONS

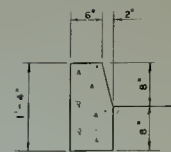
AUGUST 1957
DE LEUW, GATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

OWG. NO. R-9

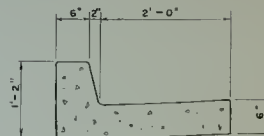


DRAINAGE DITCH

SCALE IN FEET



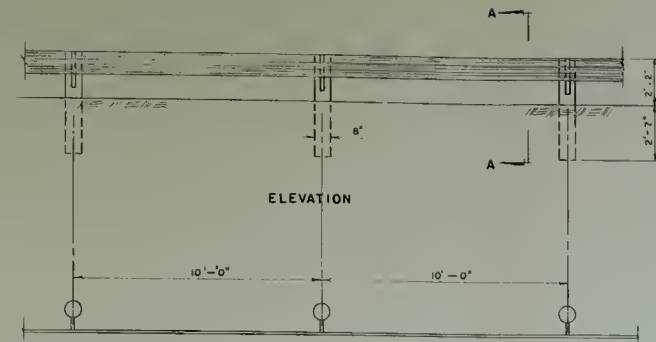
TYPE A1



TYPE A2

STANDARD CURB SECTIONS

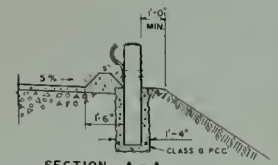
SCALE IN FEET



ELEVATION

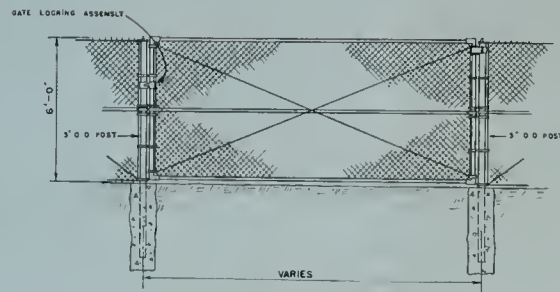
PLAN

METAL GUARD RAILING



SECTION A - A
INCLUDING ASPHALTIC CONCRETE OIKE

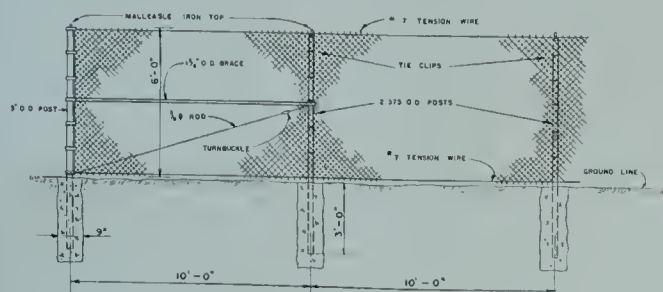
SCALE IN FEET



SINGLE GATE

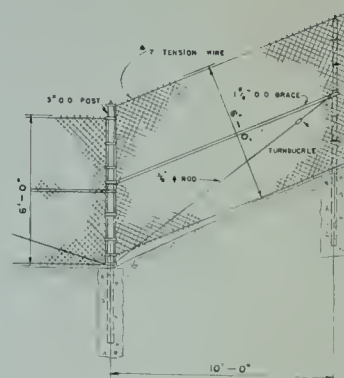
NOTES:

1. ALL POSTS, MESH AND ACCESSORIES TO BE HOT DIPPED GALVANIZED
2. ALL POSTS TO BE SET IN CLASS B1 CONCRETE
3. BRACE POSTS TO BE PLACED AT INTERVALS NOT EXCEEDING 1,000 FEET
4. ALL MESH TO BE PLACED ON ROADWAY SIDE OF POSTS.



END PANEL

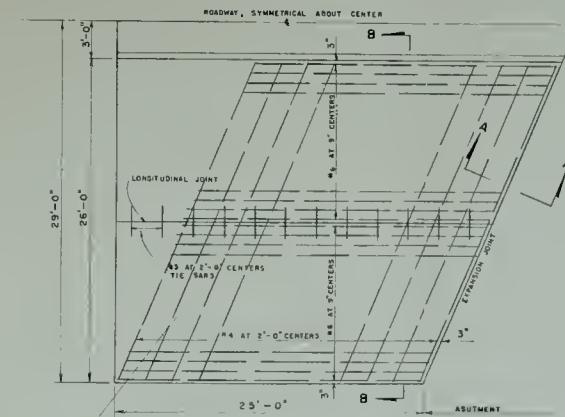
INTERMEDIATE PANEL



PANEL AT CHANGE IN GRADE

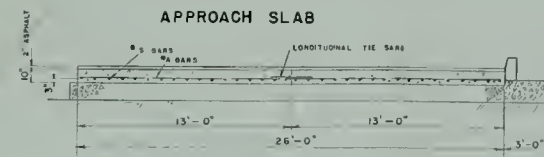
RIGHT - OF - WAY FENCE

SCALE IN FEET

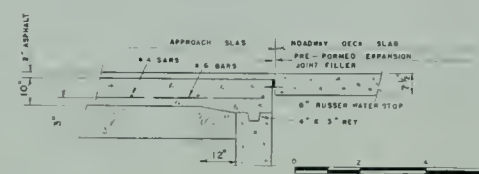


PLAN

APPROACH SLAB



SECTION B - B



SECTION A - A

SCALE IN FEET

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

MISCELLANEOUS TYPICAL

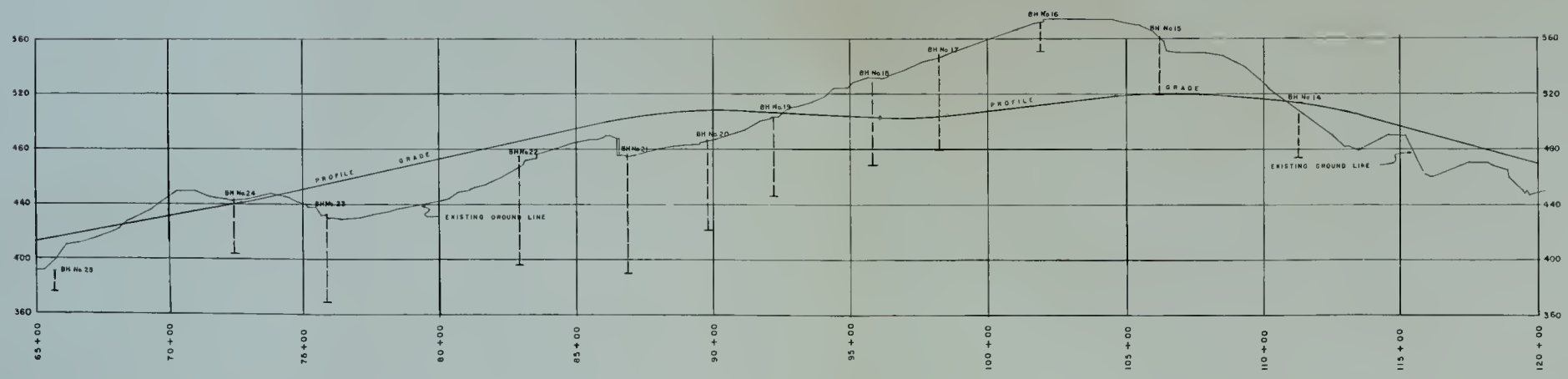
AUGUST 1957

OWG. NO. R-10

DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



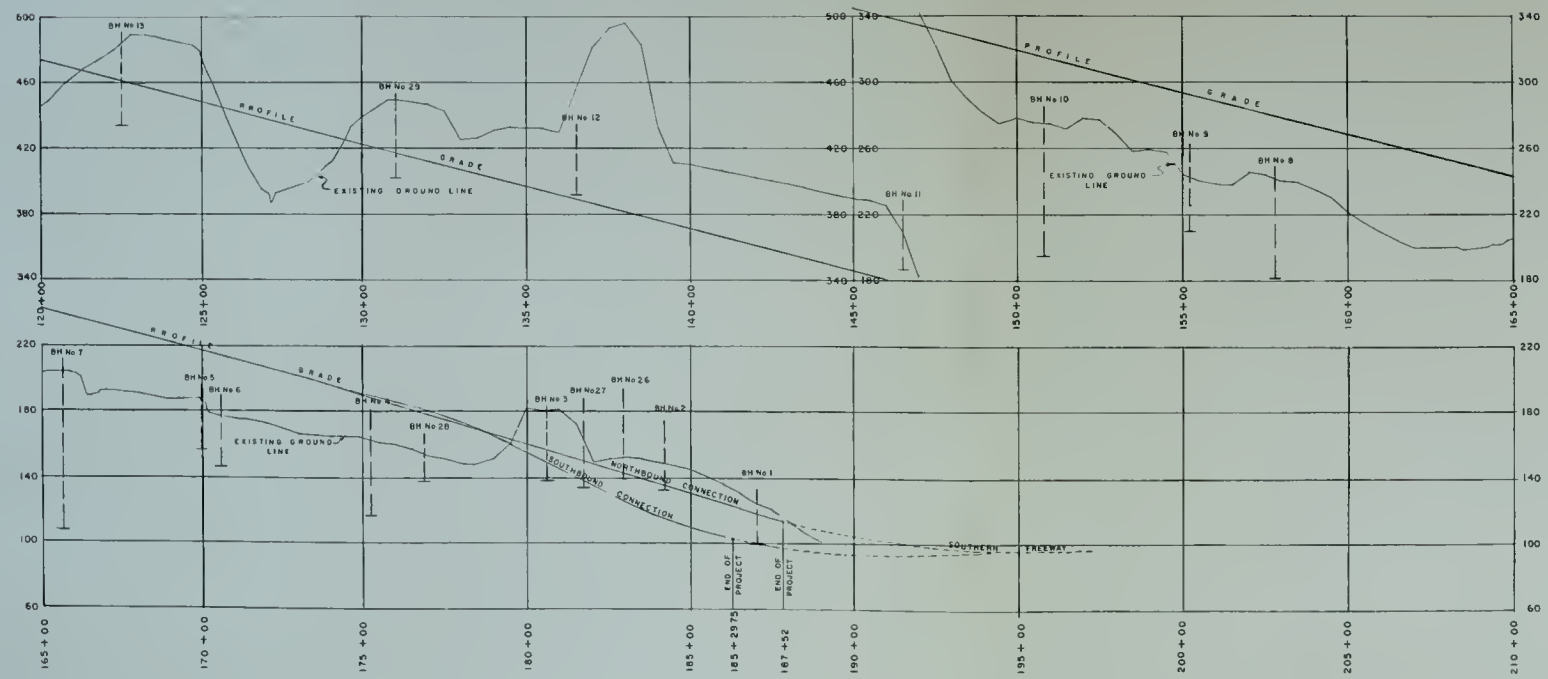
NOTES:
FOR BORING LOGS SEE DWG NO R-13



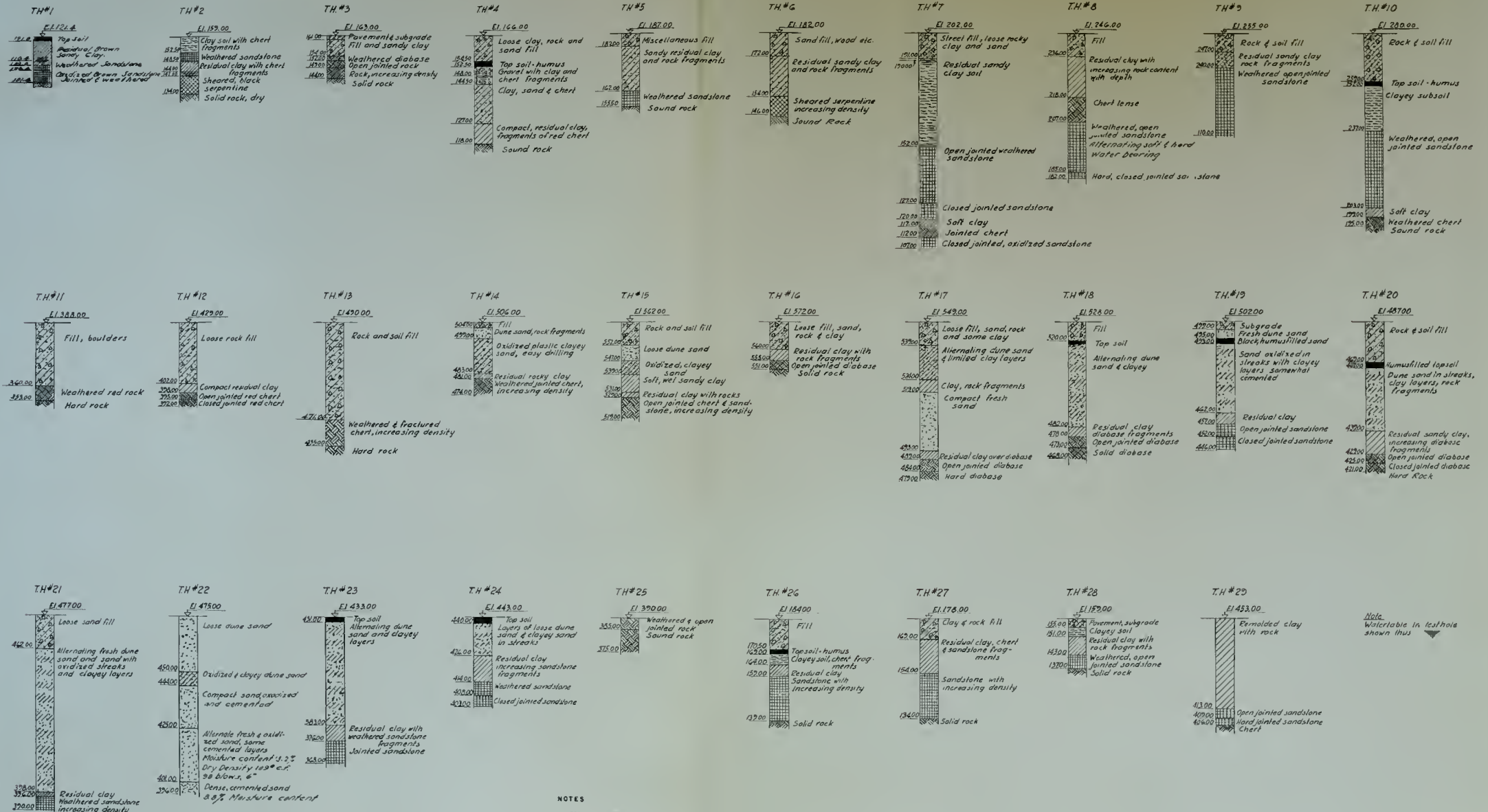
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
LOCATION OF TEST BORING
STATION 35+80 TO STATION 120+00
AUGUST 1957
DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO
DWG NO. R-11



NOTES:
FOR BORING LOGS SEE BWS NO R-13



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
LOCATION OF TEST BORING
STATION 120+00 TO STATION "B" 187+52
JANUARY 1958 OWG. NO. R-12
DE LEUW, CATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



NOTES

FOR LOCATION OF BORINGS SEE CROSS SECTION B-12

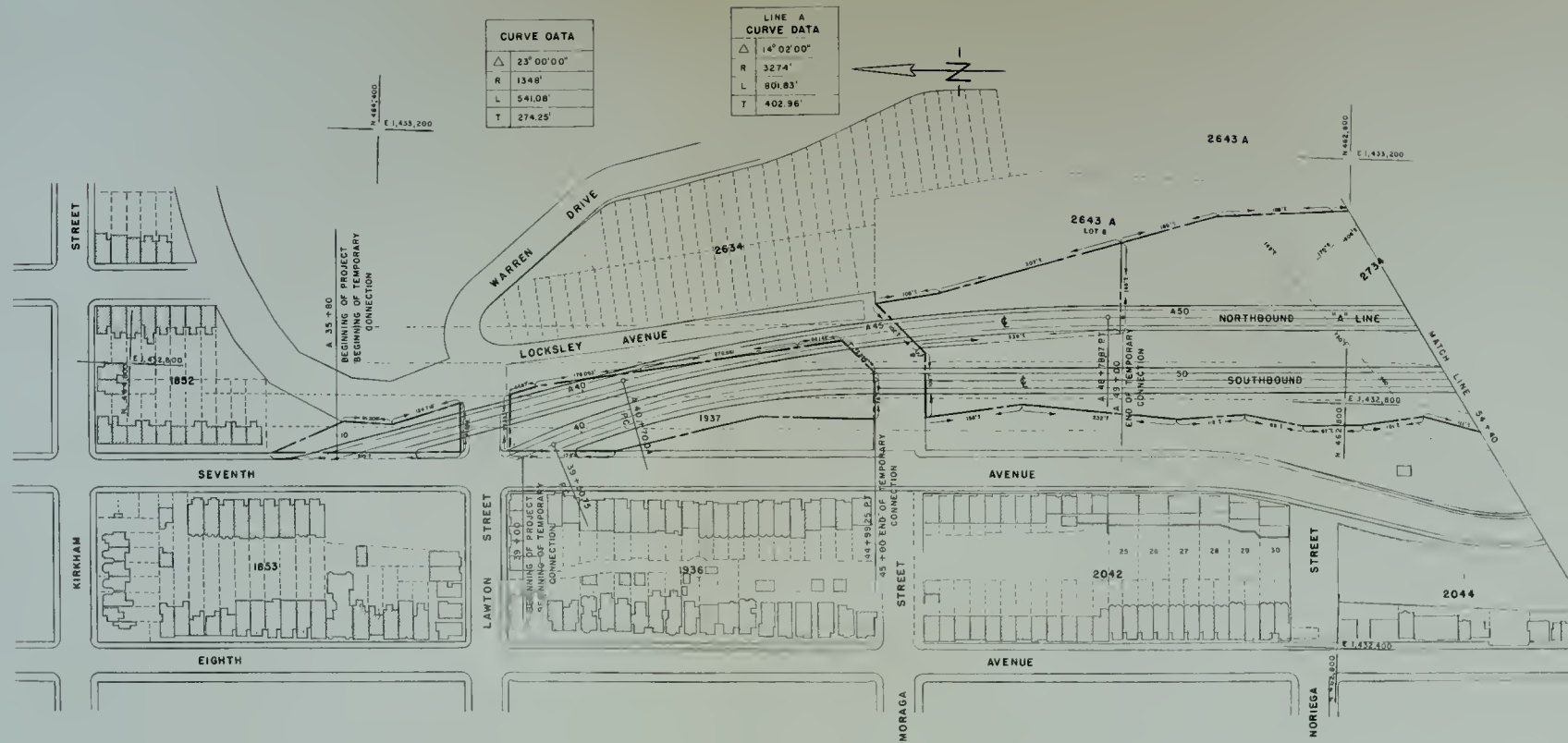
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

LOGS OF TEST BORINGS

AUGUST 1957

DWG NO. R-13

DE LEUW, CATHEN & COMPANY CONSULTING ENGINEERS - SAN FRANCISCO



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

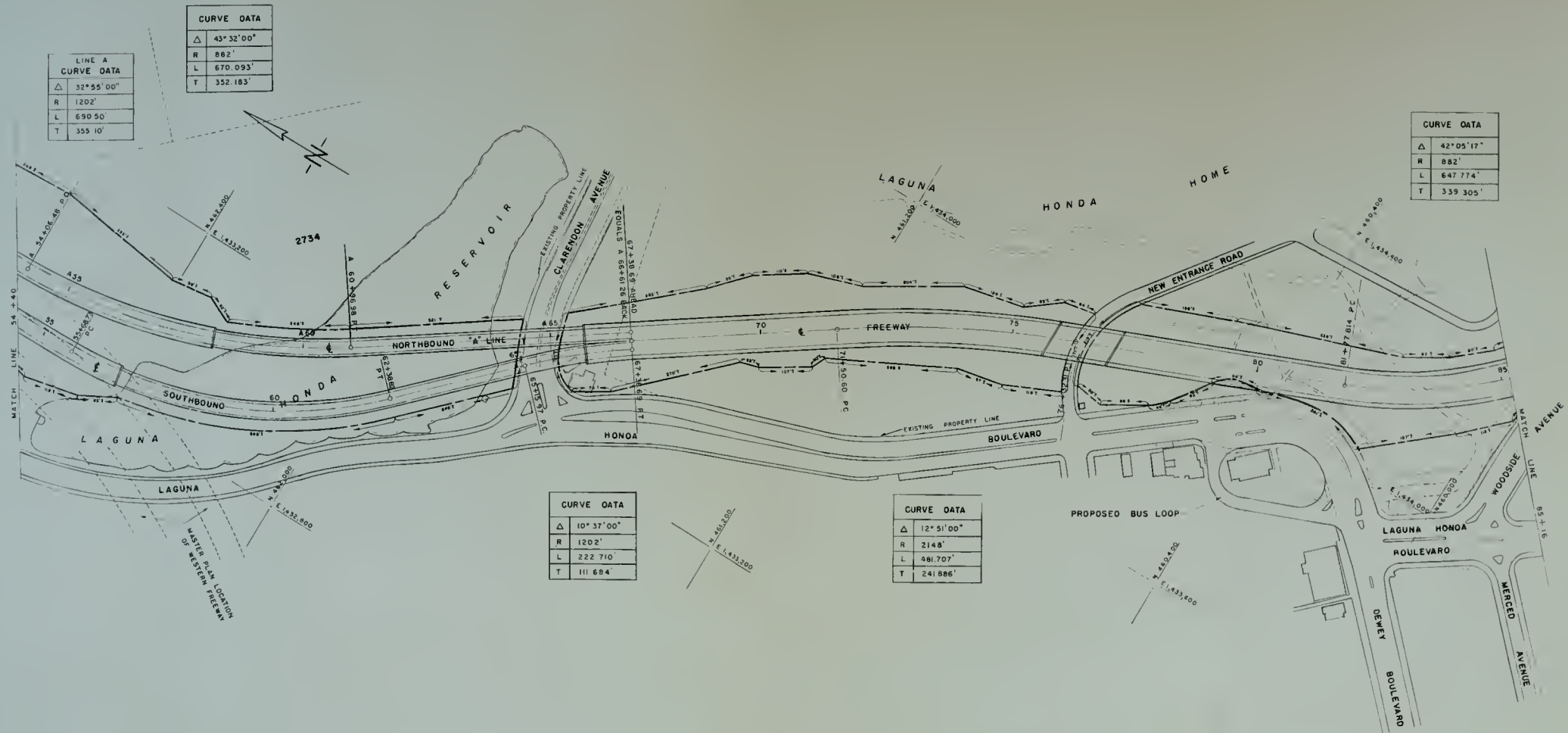
CROSTOWN FREEWAY

RIGHTS-OF-WAY
STATION "A" 35+80 TO STATION 54+40

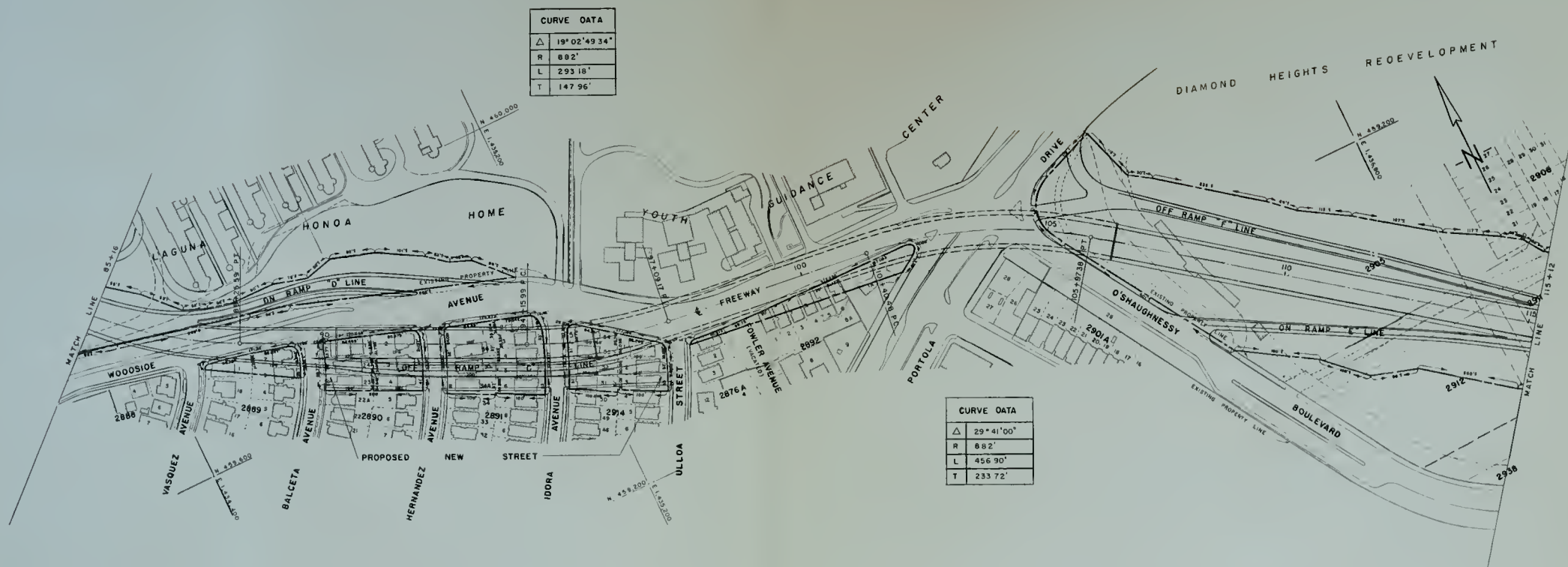
AUGUST 1957

DWG NO. R/W-1

DE LEUW, CATHART & COMPANY, CONSULTING ENGINEERS - SAN FRANCISCO



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
RIGHTS - OF - WAY
STATION 54+40 TO STATION 85+16
AUGUST 1957
DWG NO R/W-2
OF LEW, GATHER & COMPANY CONSULTING ENGINEERS - SAN FRANCISCO

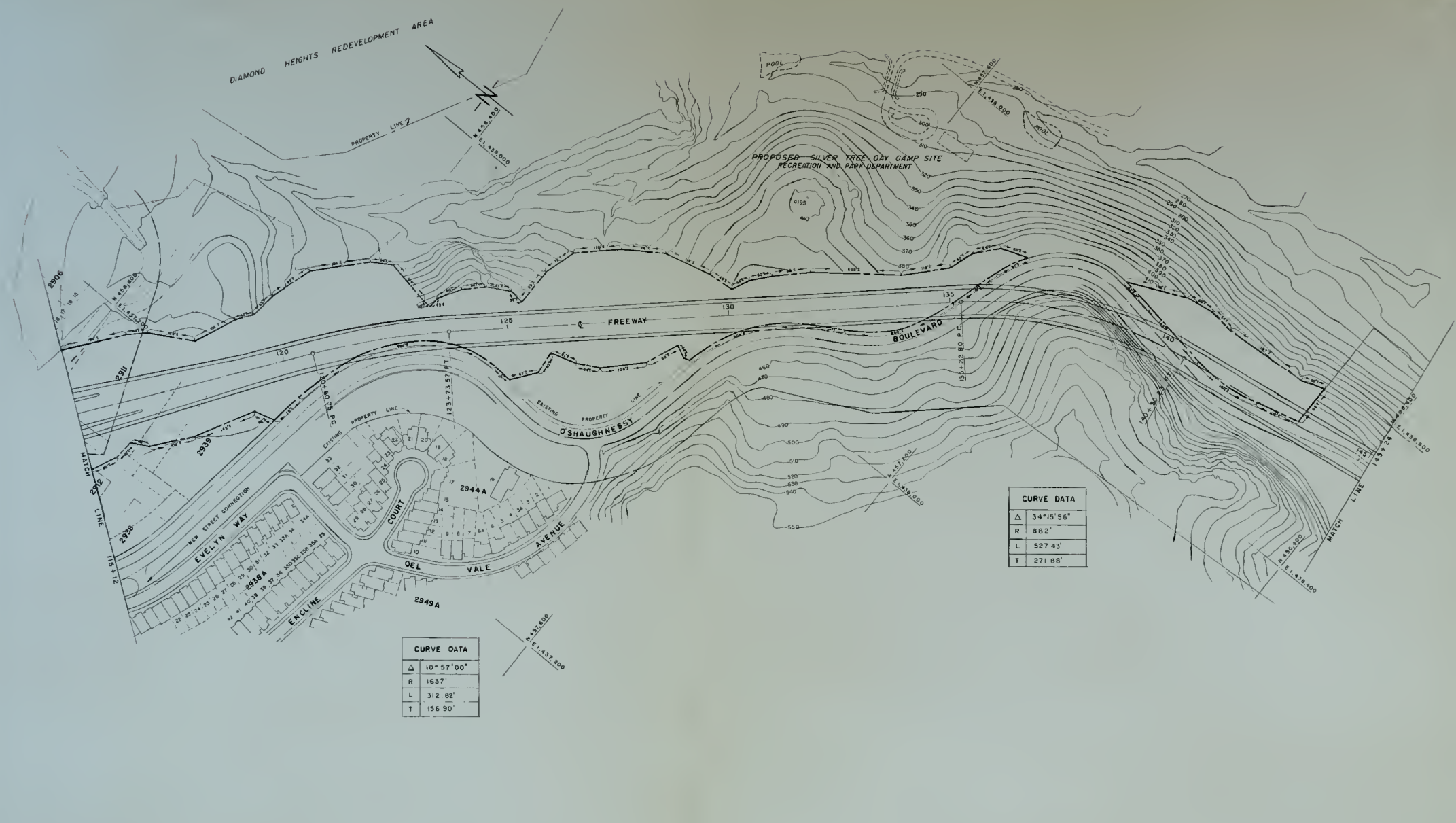


SCALE IN FEET
0 100 200 300

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

RIGHTS - OF - WAY
STATION 85+16 TO STATION 115+12

AUGUST 1957 DWO NO. R/W-3
DE LEUW, GATHER & COMPANY CONSULTING ENGINEERS - SAN FRANCISCO



CURVE DATA	
Δ	10° 57' 00"
R	1637'
L	312.82'
T	156.90'

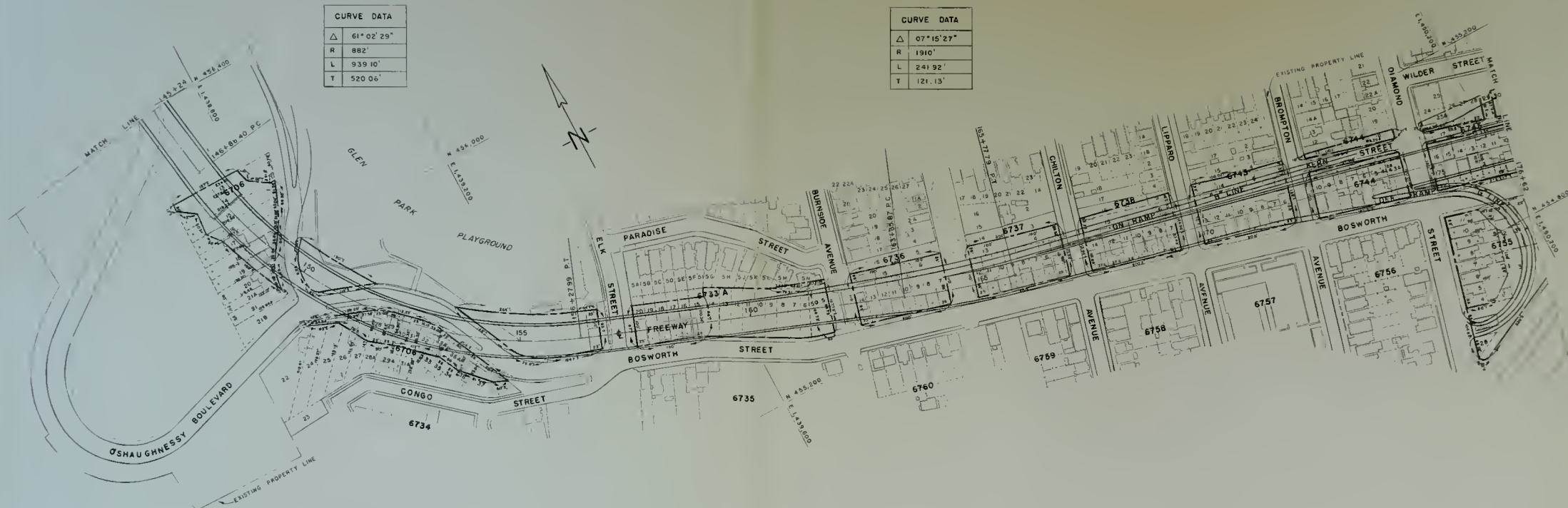
CURVE DATA	
Δ	34° 15' 56"
R	882'
L	527.43'
T	271.88'



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
RIGHTS-OF-WAY
STATION 115+12 TO STATION 145+24
AUGUST 1957
DE LEUW, GATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO
OWG NO R/W-4

CURVE DATA	
Δ	61° 02' 29"
R	882'
L	939.10'
T	520.06'

CURVE DATA	
Δ	67° 15' 27"
R	1910'
L	241.92'
T	121.13'



SCALE IN FEET
0 100 200 300

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

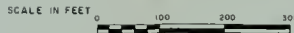
RIGHTS - OF - WAY
STATION 145+24 TO STATION 176+62

AUGUST 1957
OWG NO R/W-5
DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



LINE B CURVE DATA	
Δ	13° 56' 35"
R	1212'
L	294.92'
T	148.19'

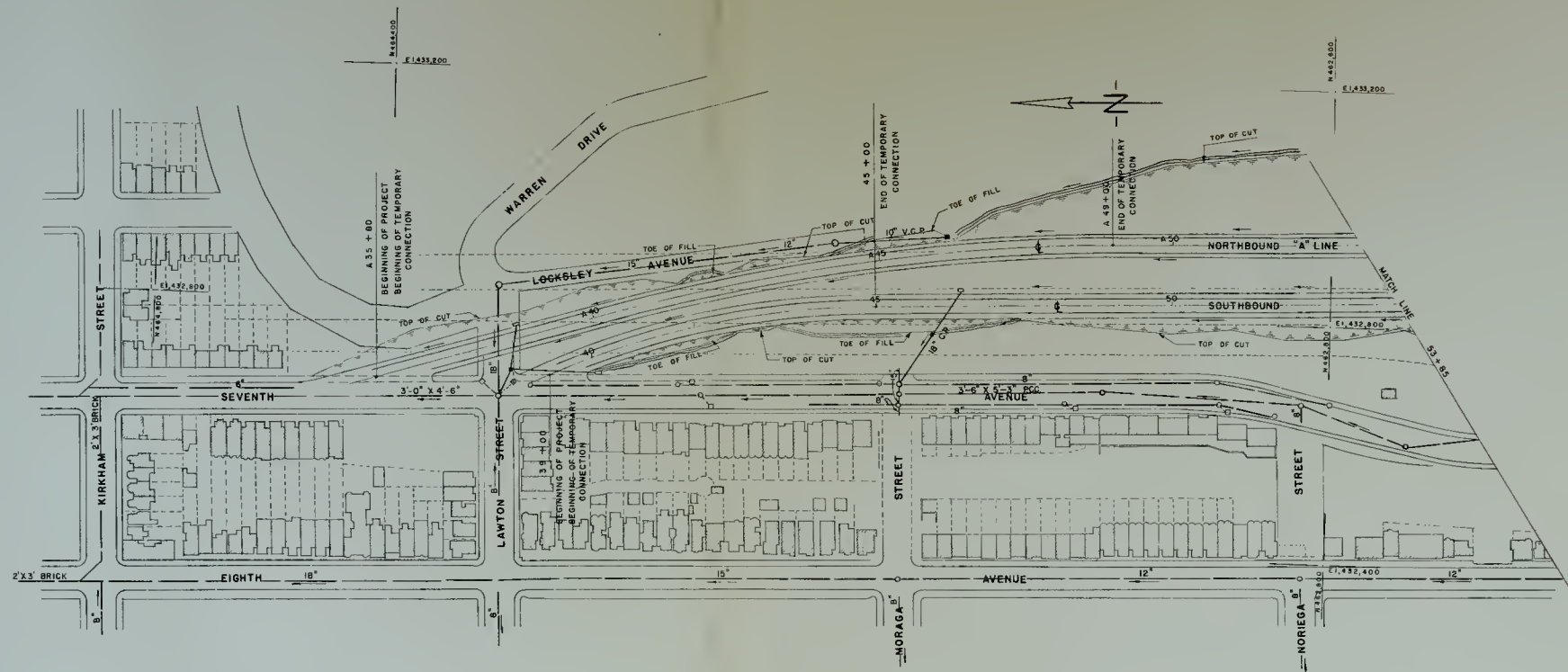
CURVE DATA	
Δ	29° 14' 10"
R	868'
L	442.88'
T	226.39'



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
RIGHTS-OF-WAY
STATION 176+62 TO STATION "B" 187+52
JANUARY 1958
OWG. NO. R/W-6
DE LEUW, CATHY & COMPANY-CONSULTING ENGINEERS - SAN FRANCISCO

NOTES:

1. ALL PIPES IN ROADWAY AT GRADE SHALL BE A MIN OF 18" REINFORCED CONCRETE PIPES UNLESS OTHERWISE NOTED
2. ALL NEW SEWERS SHALL BE VITRIFIED CLAY PIPES UNLESS OTHERWISE NOTED
3. FOR DECA DRAINAGE DETAIL, SEE DWG NO S-12
4. FOR DETAILS OF INLET, CATCH BASIN AND MANHOLE, SEE DWG NO U-7



LEGEND

- NEW SEWER
- - - EXISTING SEWER TO BE RETAINED
- - - NEW OPEN DITCH
- EXISTING MANHOLE TO BE RETAINED
- NEW CATCH BASIN
- G.C.M.P. GALVANIZED CORRUGATED METAL PIPE
- C.P. CONCRETE PIPE
- P.C.C. PORTLAND CEMENT CONCRETE
- NEW INLET IN ROADWAY AT GRADE
- - - EXISTING SEWER TO BE ABANDONED
- EXISTING CATCH BASIN TO BE RETAINED
- ⊗ EXISTING CATCH BASIN TO BE ABANDONED
- V.C.P. VITRIFIED CLAY PIPE

SCALE IN FEET 0 100 200 300

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

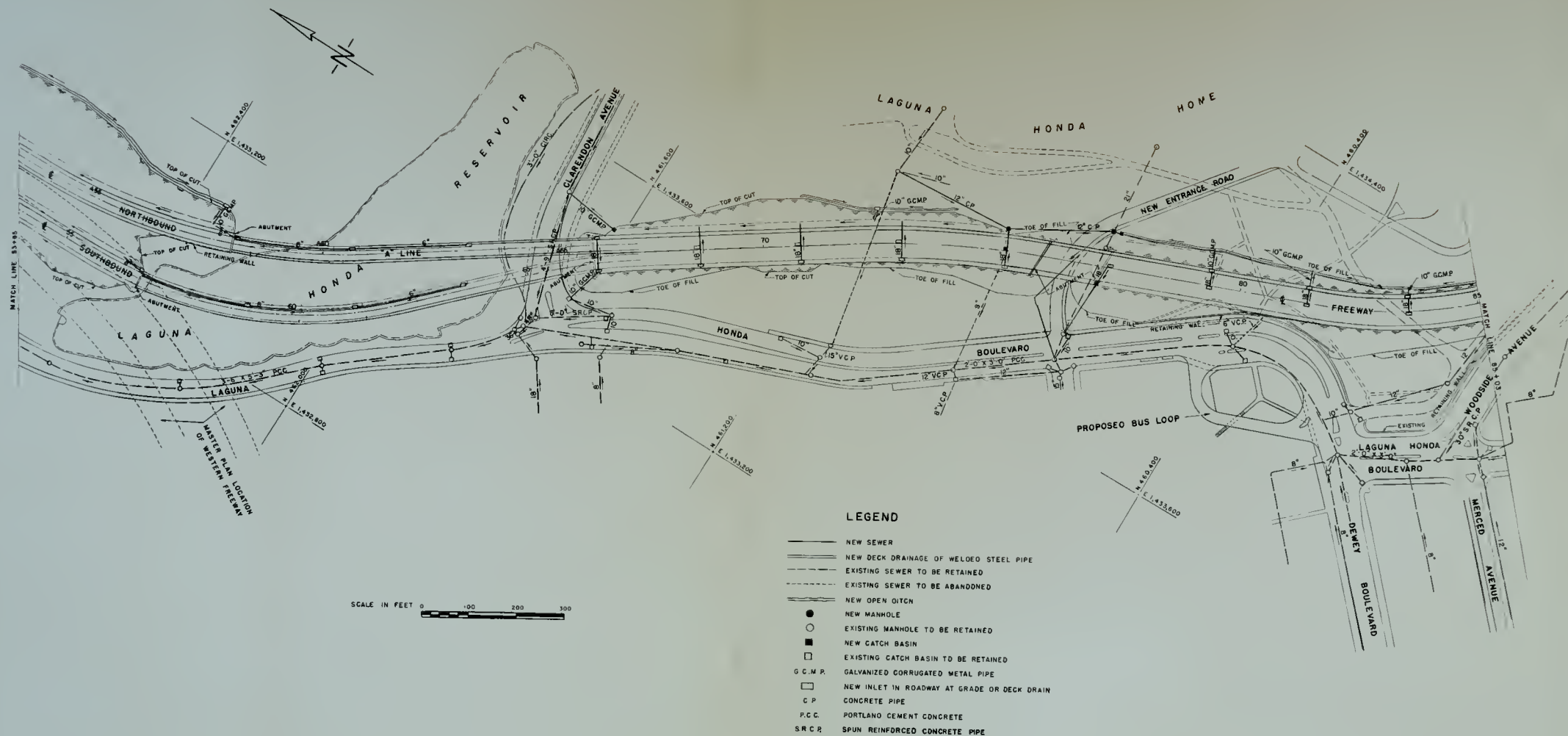
CROSSTOWN FREEWAY

MODIFICATIONS TO SEWER LINES
STATION "A" 35+80 TO STATION 53+85

AUGUST 1957

OWG. NO. U-1

DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

MODIFICATIONS TO SEWER LINES
STATION 53 + 85 TO STATION 85 + 03

AUGUST 1957

DWG NO. U-2

DE LEUW, CATNER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



SCALE IN FEET 0 100 200 300

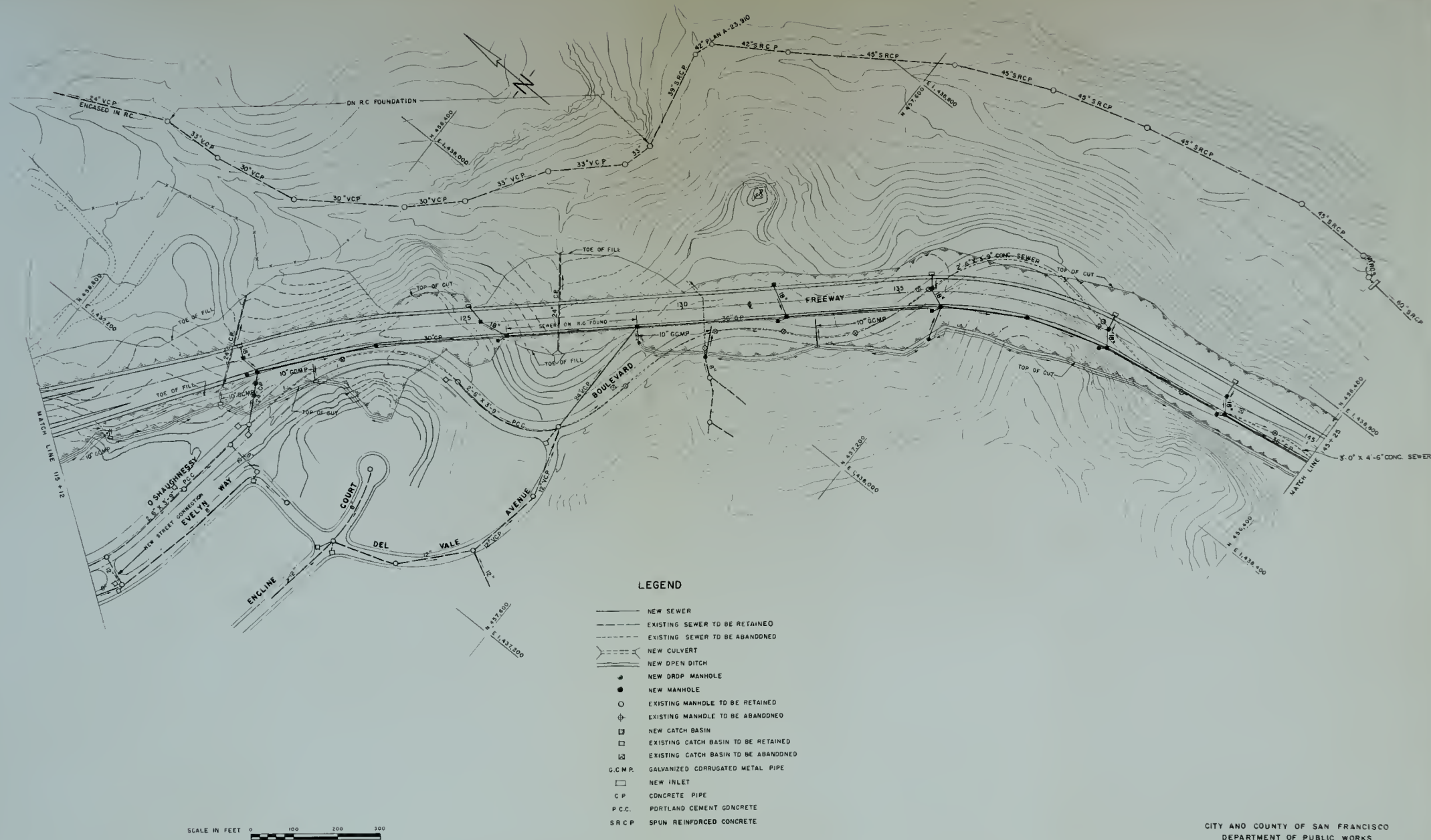
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

MODIFICATIONS TO SEWER LINES
STATION 85 + 03 TO STATION 115 + 12

AUGUST 1957

DWG. NO. U-3

DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

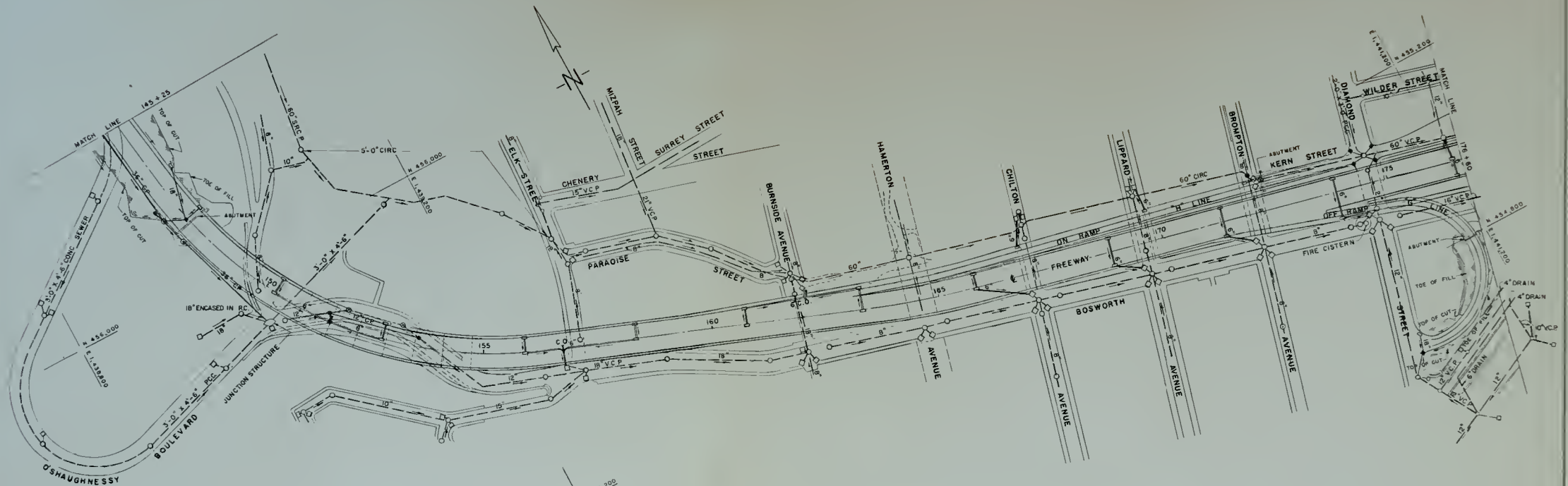
CROSTOWN FREEWAY

MODIFICATIONS TO SEWER LINES
STATION 115 + 12 TO STATION 145 + 25

AUGUST 1957

OWG NO. U-4

DE LEUW, CATHY B COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



LEGEND

- NEW SEWER
- NEW DECK DRAINAGE
- - - EXISTING SEWER TO BE RETAINED
- - - EXISTING SEWER TO BE ABANDONED
- - - NEW OPEN DITCH
- NEW DROP MANHOLE
- NEW MANHOLE
- EXISTING MANHOLE TO BE RETAINED
- EXISTING MANHOLE TO BE ABANDONED
- NEW CATCH BASIN
- EXISTING CATCH BASIN TO BE RETAINED
- NEW INLET IN ROADWAY AT GRADE OR DECK DRAIN
- C.P. CONCRETE PIPE
- P.C.C. PORTLAND CEMENT CONCRETE
- C.O. CLEAN OUT

SCALE IN FEET 0 100 200 300

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

MODIFICATIONS TO SEWER LINES
STATION 145 + 25 TO STATION 176 + 60

AUGUST 1957 DWG NO. U-5
DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

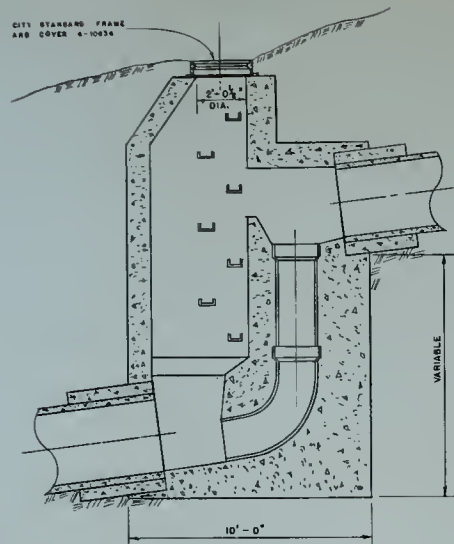
CROSSTOWN FREEWAY

MODIFICATIONS TO SEWER LINES
STATION 176 + 60 TO STATION "B" 187+52

JANUARY 1958

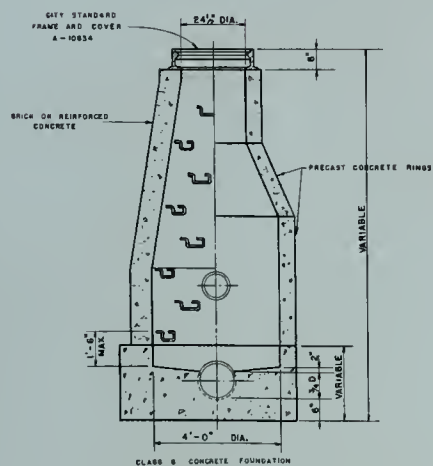
DWG. NO. U-6

DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



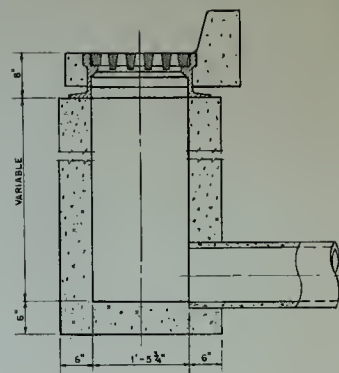
DROP MANHOLE

SCALE IN FEET

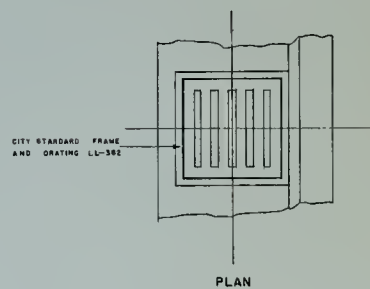


MANHOLE

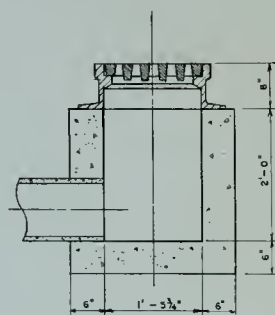
SCALE IN FEET



STORM WATER INLET AT CURB

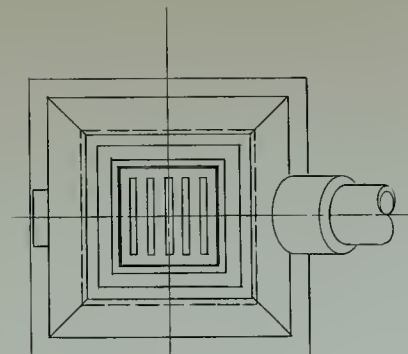


INLET FRAME AND GRATING

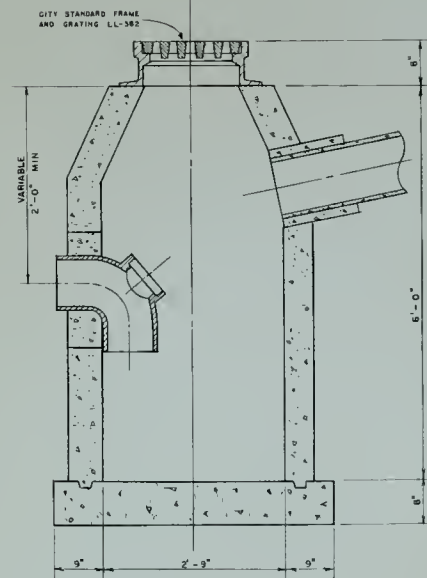


STORM WATER INLET

SCALE IN FEET



PLAN



CATCH BASIN WITH INLET AND CAST IRON TRAP

SCALE IN FEET

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

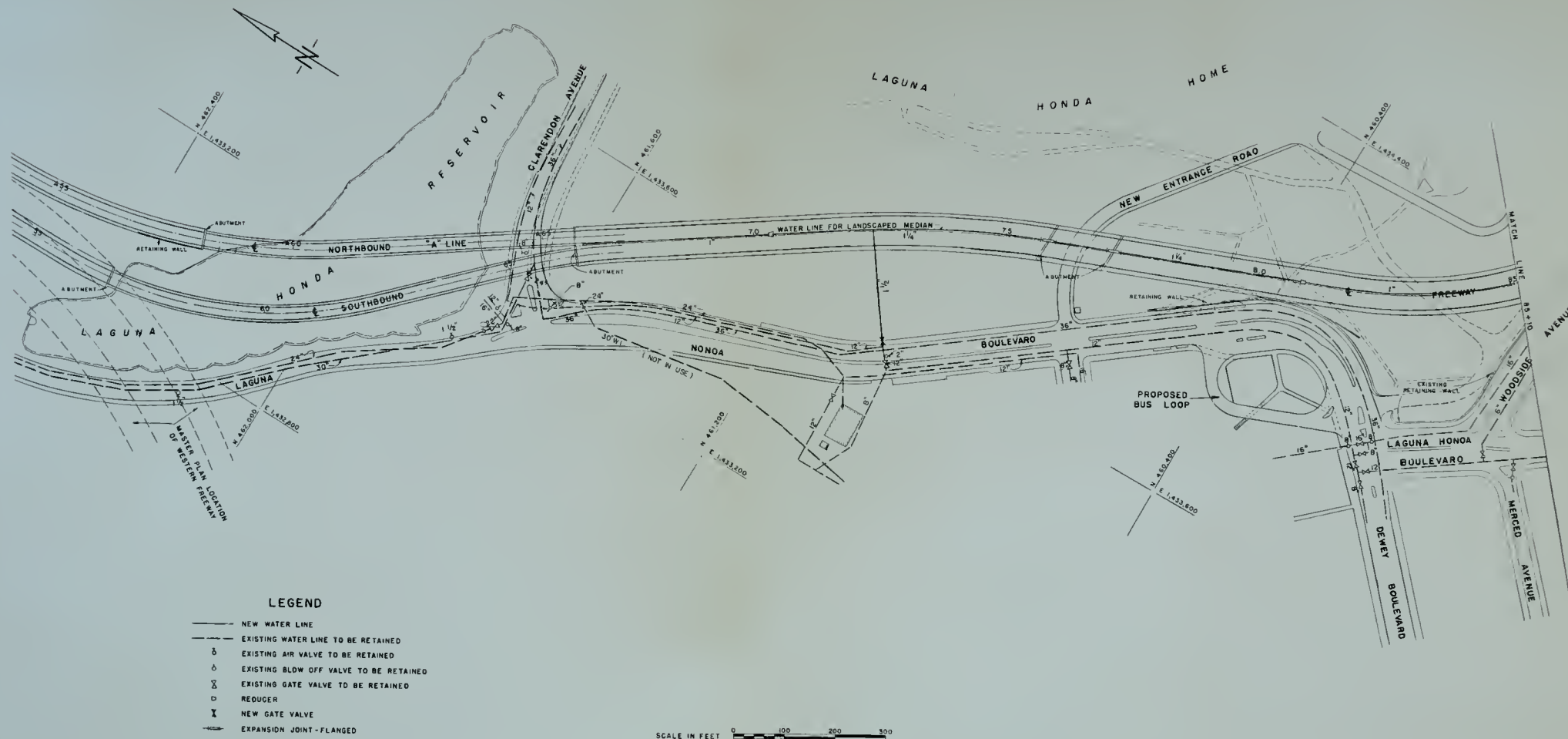
CROSSTOWN FREEWAY

TYPICAL DRAINAGE DETAILS

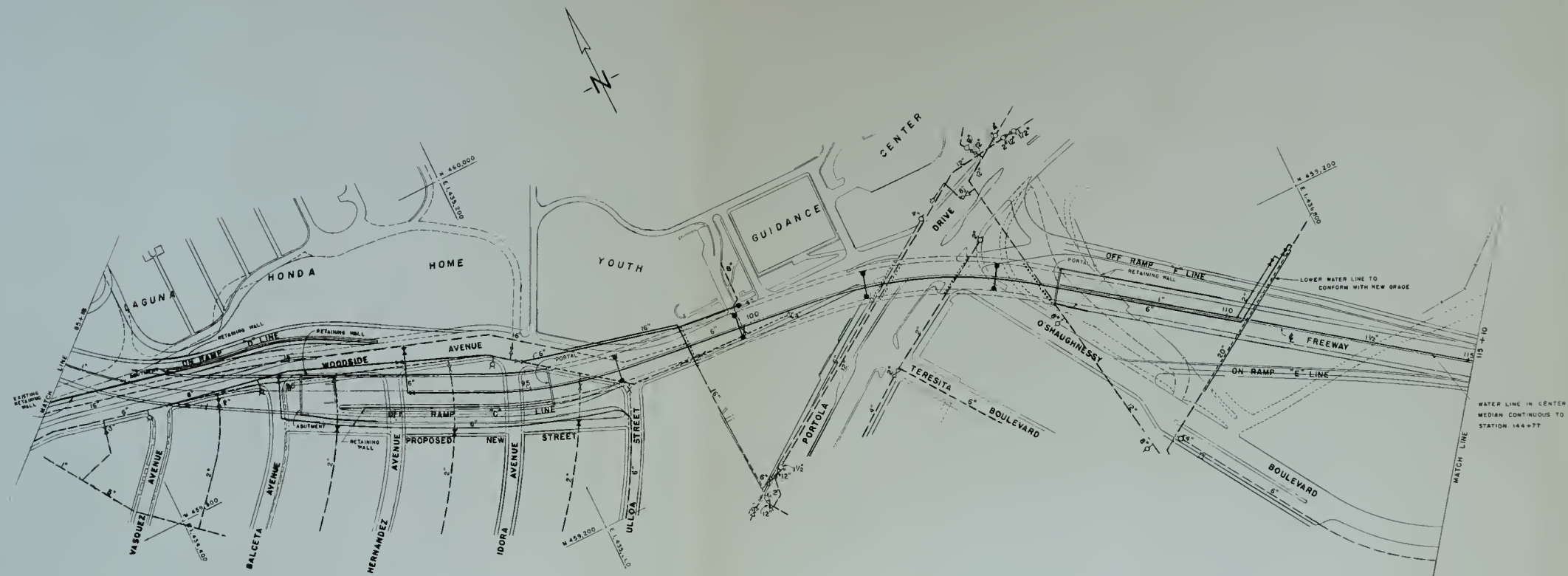
AUGUST 1957

OWG NO. U-7

DE LEUW CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



CITY AND COUNTY OF SAN FRANCISCO
 DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
 MODIFICATIONS TO
 WATER DISTRIBUTION LINES
 STATION 55 + 00 TO STATION 85 + 10
 AUGUST 1957 OWS NO. U-8
 DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



SCALE IN FEET 0 100 200 300

LEGEND

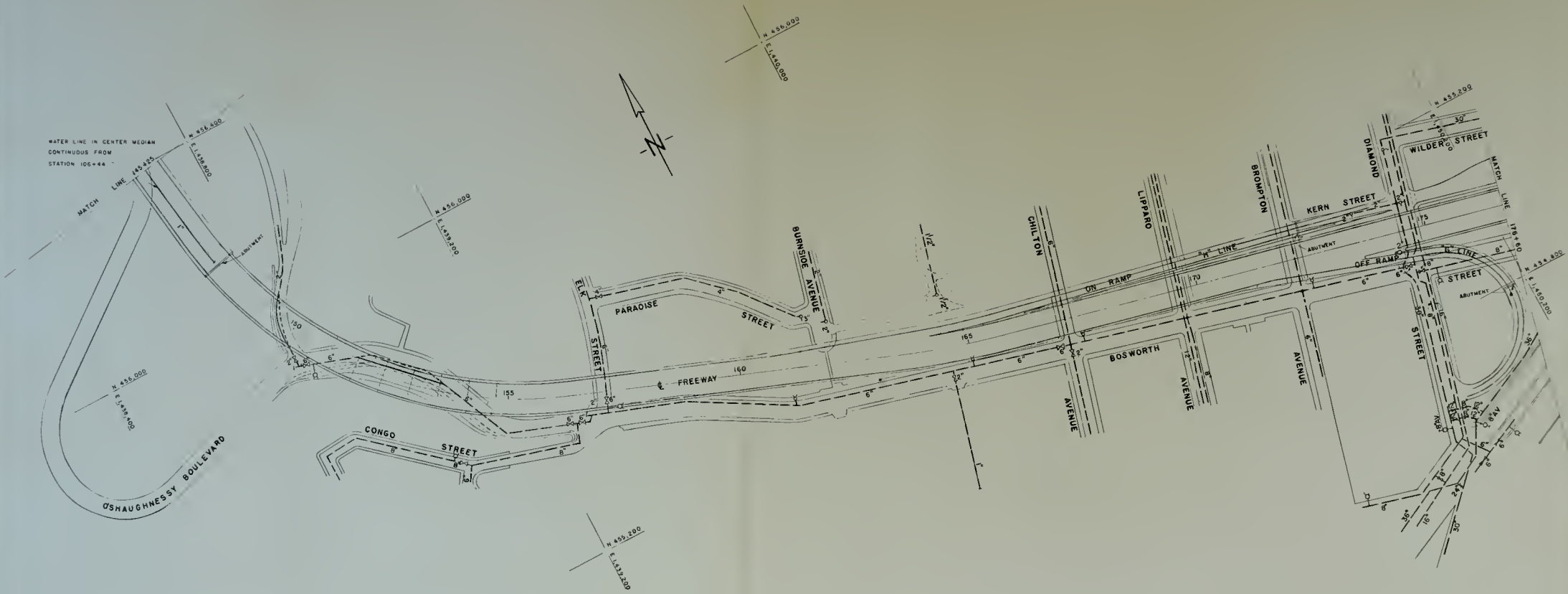
- NEW WATER LINE
- - - EXISTING WATER LINE TO BE RETAINED
- - - EXISTING WATER LINE TO BE ABANDONED
- - - - - TEMPORARY LINES FOR DURATION OF CONSTRUCTION
- NEW BLOW OFF VALVE
- ⊕ EXISTING BLOW OFF VALVE TO BE ABANDONED
- ⊕ EXISTING BLOW OFF VALVE TO BE RETAINED
- ⊕ NEW GATE VALVE
- ⊕ EXISTING GATE VALVE TO BE RETAINED
- ⊕ EXISTING GATE VALVE TO BE ABANDONED
- ⊕ EXISTING WATER METER TO BE RETAINED
- ⊕ NEW FIRE HYDRANT
- ⊕ EXISTING FIRE HYDRANT TO BE RETAINED
- ⊕ EXISTING AIR VALVE TO BE RETAINED

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

MODIFICATIONS TO
WATER DISTRIBUTION LINES
STATION 85+10 TO STATION 115+10

AUGUST 1957 DWG. NO. U-9

DE LEUW, CATHY B. COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



LEGEND

- _____ NEW WATER LINE
 _____ EXISTING WATER LINE TO BE RETAINED
 - - - - - EXISTING WATER LINE TO BE ABANDONED
 H EXISTING FIRE HYDRANT TO BE RETAINED
 + + EXISTING GATE VALVE TO BE RETAINED
 O EXISTING BLOW OFF VALVE TO BE RETAINED



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

MODIFICATIONS TO
WATER DISTRIBUTION LINES
STATION 145 + 25 TO STATION 176 + 60

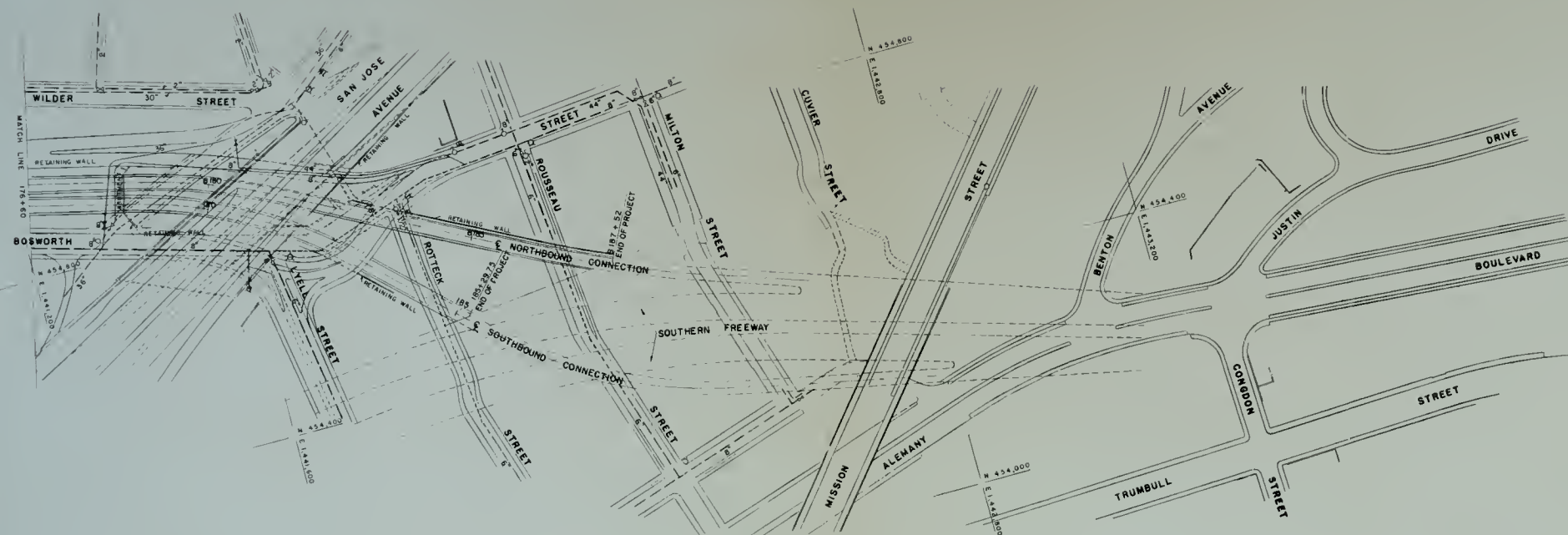
AUGUST 1957

OWG, NO U-10

DE LEUW, CATHAR B COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

LEGEND

—	NEW WATER LINE
- - -	EXISTING WATER LINE TO BE RETAINED
- - -	EXISTING WATER LINE TO BE ABANDONEO
⊕	EXISTING FIRE HYDRANT TO BE RETAINED
⊕	EXISTING FIRE HYDRANT TO BE RELOCATED
⊕	RELOCATED FIRE HYDRANT
⊕	EXISTING BLOW OFF VALVE TO BE RETAINED
⊕	EXISTING BLOW OFF VALVE TO BE ABANDONEO
⊕	NEW GATE VALVE
⊕	EXISTING GATE VALVE TO BE RETAINED
⊕	EXISTING GATE VALVE TO BE ABANDONEO
⊕	EXISTING AIR VALVE TO BE RETAINED



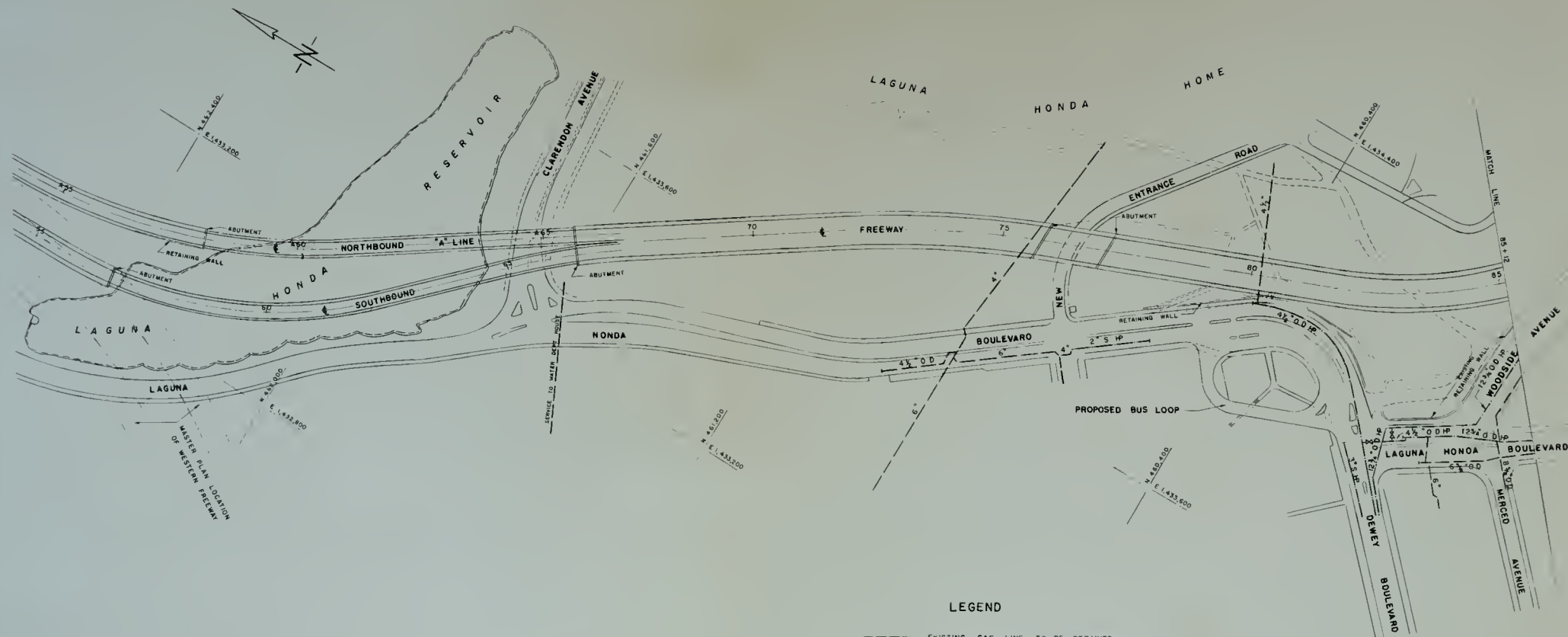
SCALE IN FEET 0 100 200 300

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

MODIFICATIONS TO
WATER DISTRIBUTION LINES
STATION 176+60 TO STATION 187+52

JANUARY 1958 DWG. NO. U-11

DE LEUW, GATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



LEGEND

- EXISTING GAS LINE TO BE RETAINED
- EXISTING HIGH PRESSURE GAS LINE TO BE RETAINED
- ⊗ EXISTING GATE VALVE TO BE RETAINED

SCALE IN FEET



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

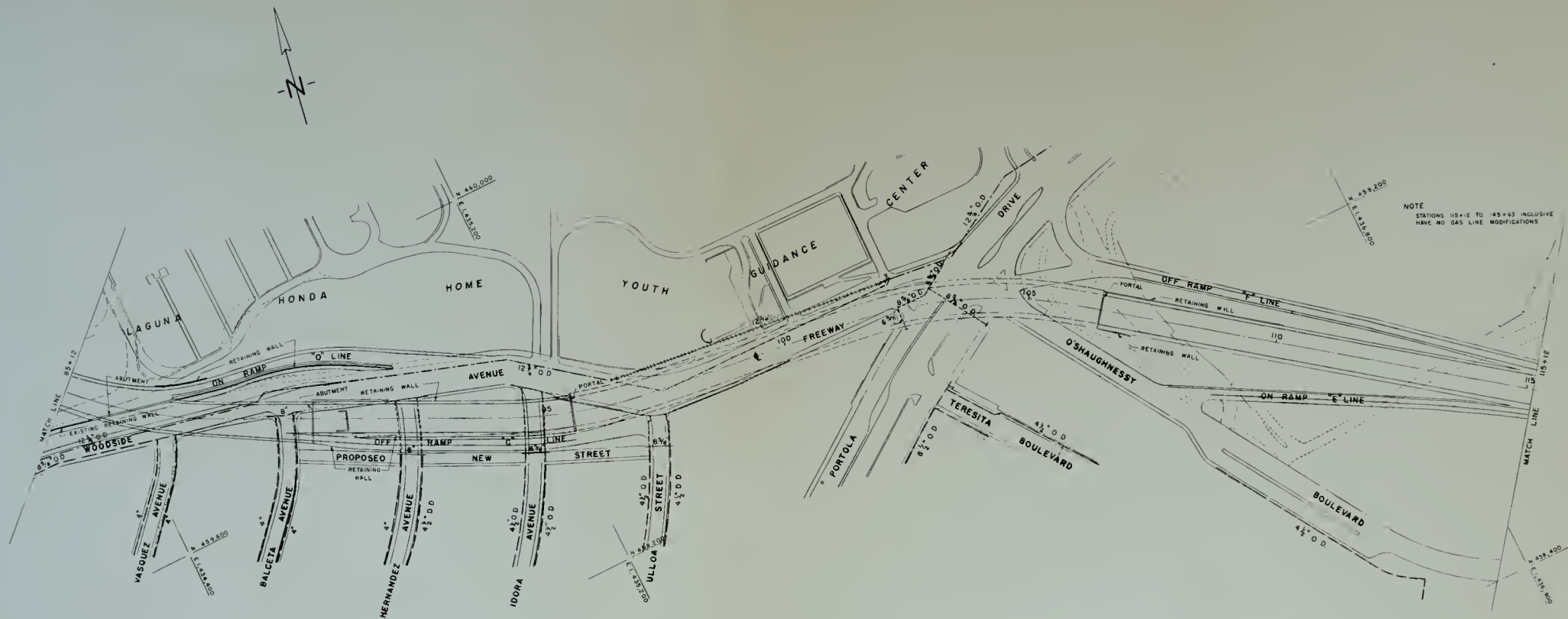
CROSTOWN FREEWAY

MODIFICATIONS TO
GAS DISTRIBUTION LINES
STATION 55+00 TO STATION 85+12

AUGUST 1957

OWG NO U-12

DE LEW, GATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

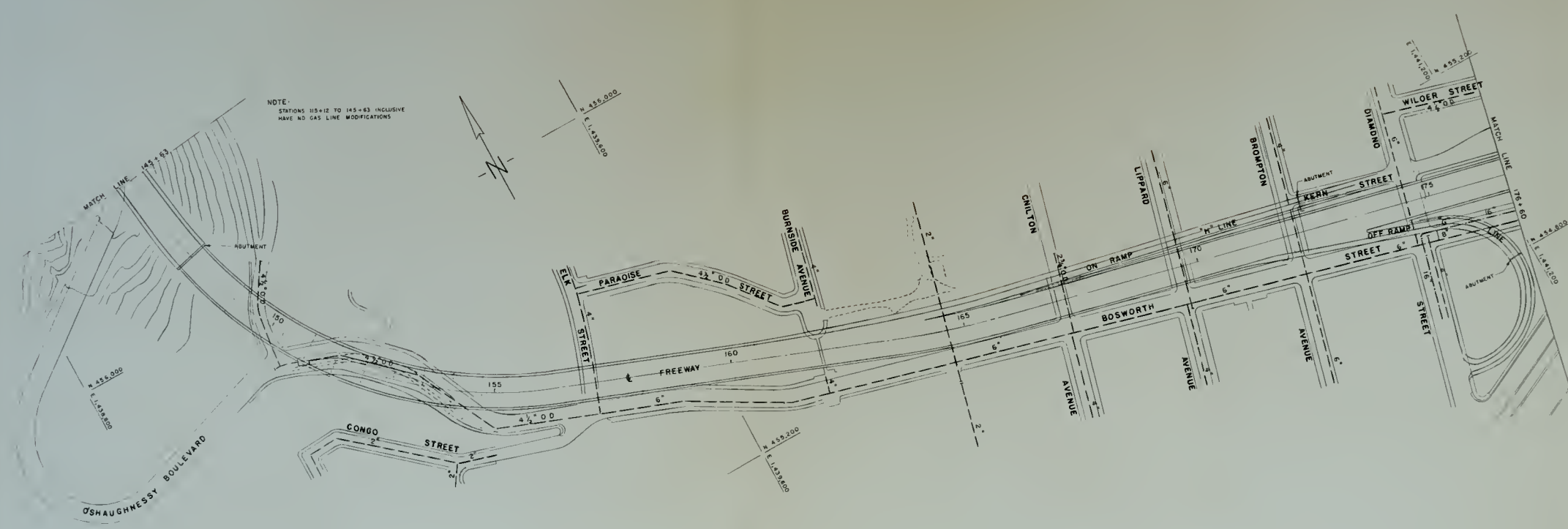


LEGEND

- NEW GAS LINE
- - - - EXISTING GAS LINE TO BE RETAINED
- - - - EXISTING GAS LINE TO BE ABANDONED
- ~~~~~ NEW HIGH PRESSURE GAS LINE
- ~~~~~ EXISTING HIGH PRESSURE GAS LINE TO BE RETAINED
- ~~~~~ EXISTING HIGH PRESSURE GAS LINE TO BE ABANDONED
- - - - EXISTING GAS VALVE TO BE RETAINED
- NEW GAS VALVE



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
MODIFICATIONS TO
GAS DISTRIBUTION LINES
STATION 85+12 TO STATION 115+12
AUGUST 1957 O&W NO. U-13
DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS SAN FRANCISCO



NOTE:
STATIONS 145+12 TO 145+63 INCLUSIVE
HAVE NO GAS LINE MODIFICATIONS

LEGEND

- NEW GAS LINE
- - - - EXISTING GAS LINE TO BE RETAINED
- EXISTING GAS LINE TO BE ABANDONED
- EXISTING HIGH PRESSURE GAS LINE TO BE RETAINED

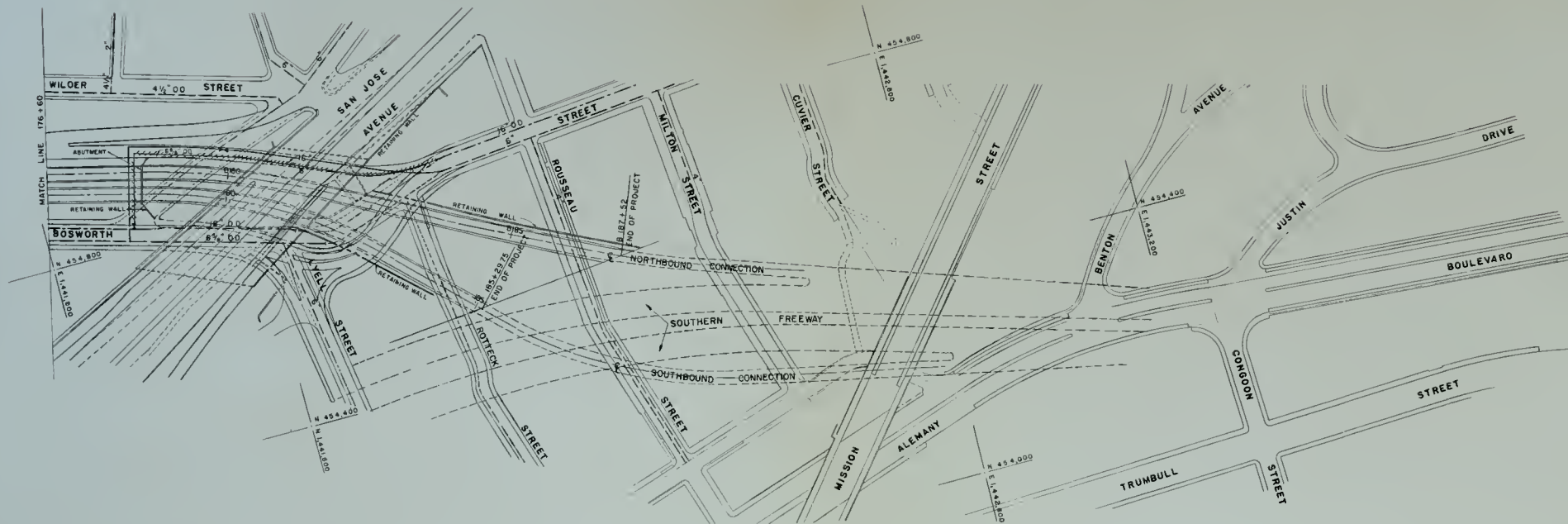


CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
MODIFICATIONS TO
GAS DISTRIBUTION LINES
STATION 145+63 TO STATION 176+60
AUGUST 1957
DWG NO U-14
DE LEUW, CATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

LEGEND

- NEW GAS LINE
- - - EXISTING GAS LINE TO BE RETAINED
- - - EXISTING GAS LINE TO BE ABANDONED
- ===== NEW HIGH PRESSURE GAS LINE
- - - EXISTING HIGH PRESSURE GAS LINE TO BE RETAINED
- - - EXISTING HIGH PRESSURE GAS LINE TO BE ABANDONED
- ⋈ NEW GAS VALVE

SCALE IN FEET 0 100 200 300



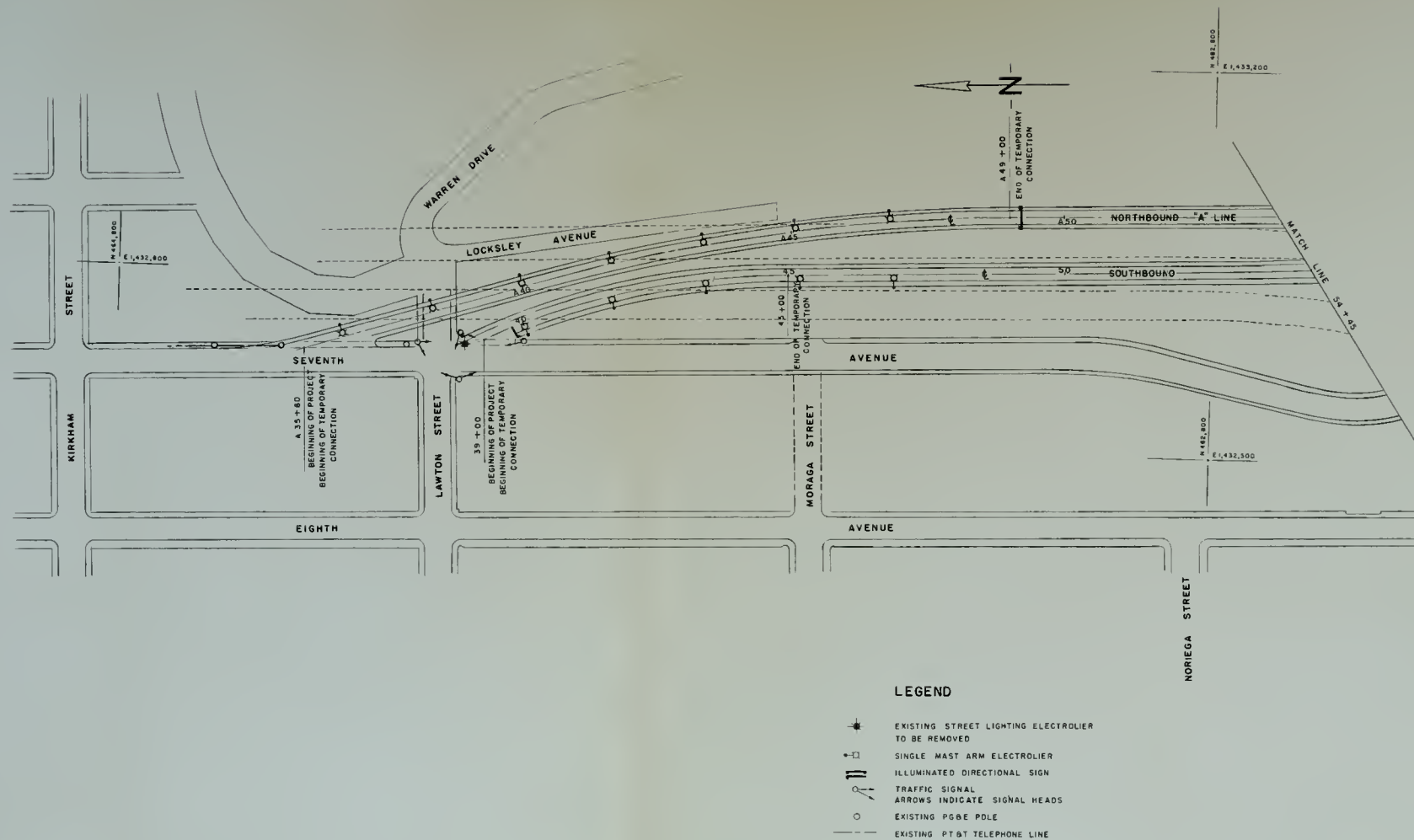
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

CROSTOWN FREEWAY

MODIFICATIONS TO
GAS DISTRIBUTION LINES
STATION 176+60 TO STATION 187+52

JANUARY 1958 OWG. NO. U-15

DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



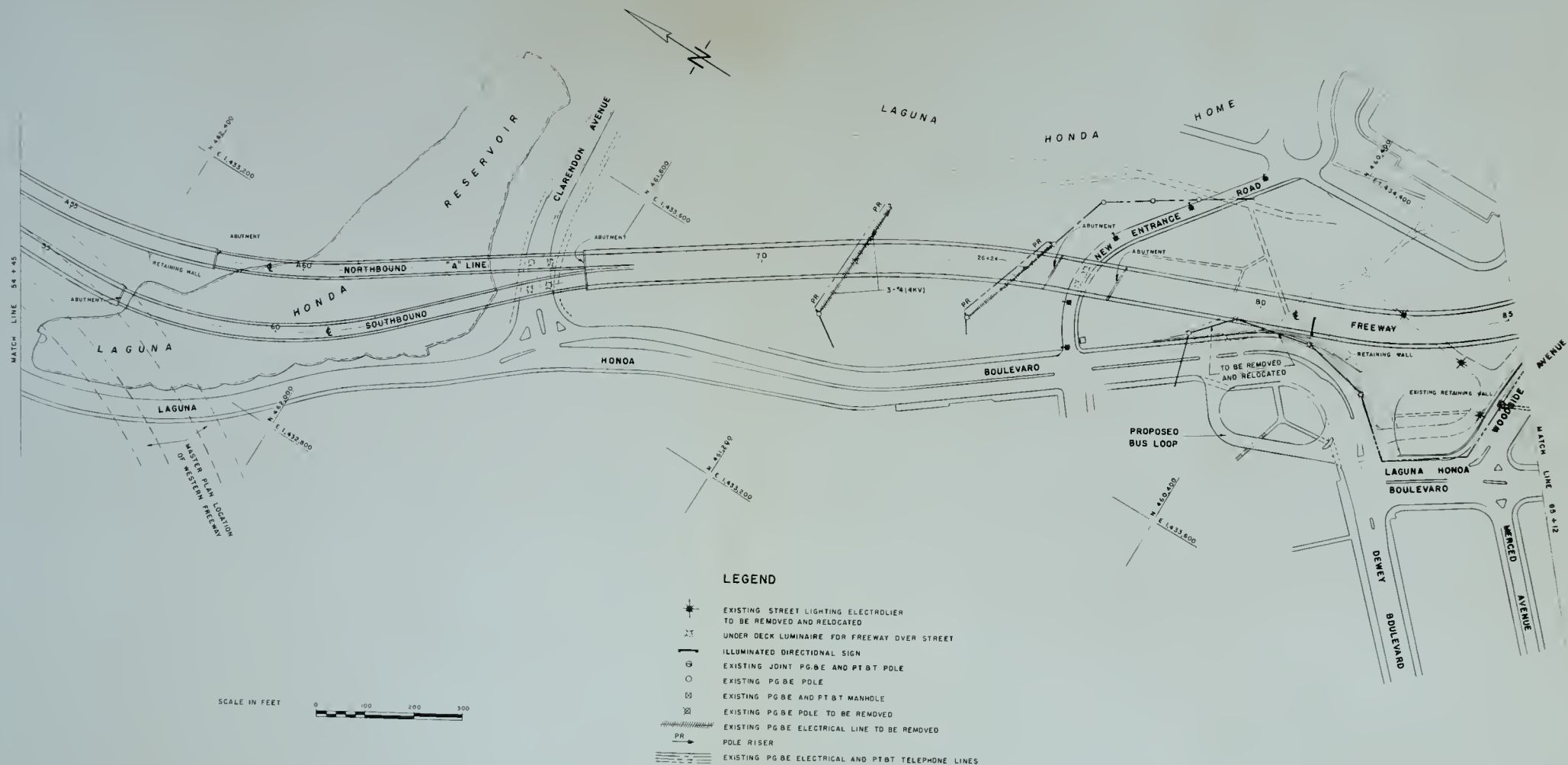
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

ELECTRICAL PLAN
STATION "A" 35+80 TO STATION 54+45

AUGUST 1957 DWG. NO. U-16
DE LEUW, CATHART & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

NOTES

EXISTING ELECTROLIERS SHOWN ON PRESENT LAGUNA HONOA HOME
ENTRANCE ROAD SHALL BE REMOVED AND RELOCATED TO NEW ENTRANCE ROAD
PROVIDE SERIES LOOP AND CONNECT TO EXISTING LAGUNA HONOA HOME
STREET LIGHTING SYSTEM

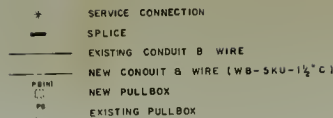


CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

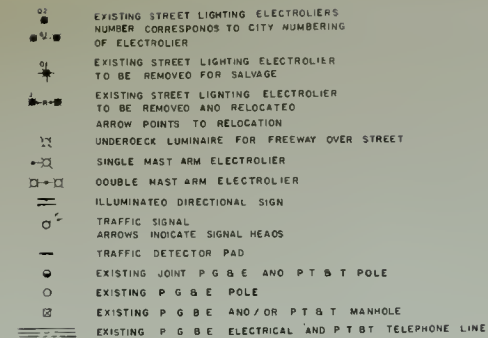
ELECTRICAL PLAN
STATION 54 + 45 TO STATION 85 + 12

AUGUST 1957
DE LEUW, CATHART & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

WIRING SYMBOLS

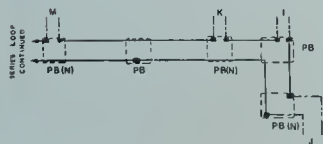


LEGEND



TRAFFIC SIGNALIZATION

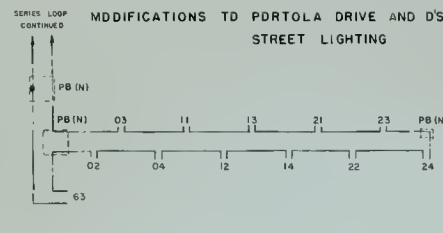
PORTOLA DRIVE — O'SHAUGHNESSY BOULEVARD — "OFF RAMP" — WOODSIDE AVENUE

MODIFICATIONS TO WOODSIDE AVENUE
STREET LIGHTING

ELECTROLIERS 1, 4, K, & M SHALL BE REMOVED
DURING CONSTRUCTION AND RELOCATED AFTER
COMPLETION

MODIFICATIONS TO WOODSIDE AVE. AND PORTOLA DRIVE
STREET LIGHTING

ELECTROLIERS # 61, A, B, C, D, E, & F SHALL BE REMOVED DURING
CONSTRUCTION AND REINSTALLED AFTER COMPLETION

MODIFICATIONS TO PORTOLA DRIVE AND O'SHAUGHNESSY BLVD.
STREET LIGHTING

ELECTROLIER # 63 SHALL BE REMOVED AND STORED DURING
CONSTRUCTION AND REINSTALLED AFTER COMPLETION.

SCALE IN FEET
0 100 200 300

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

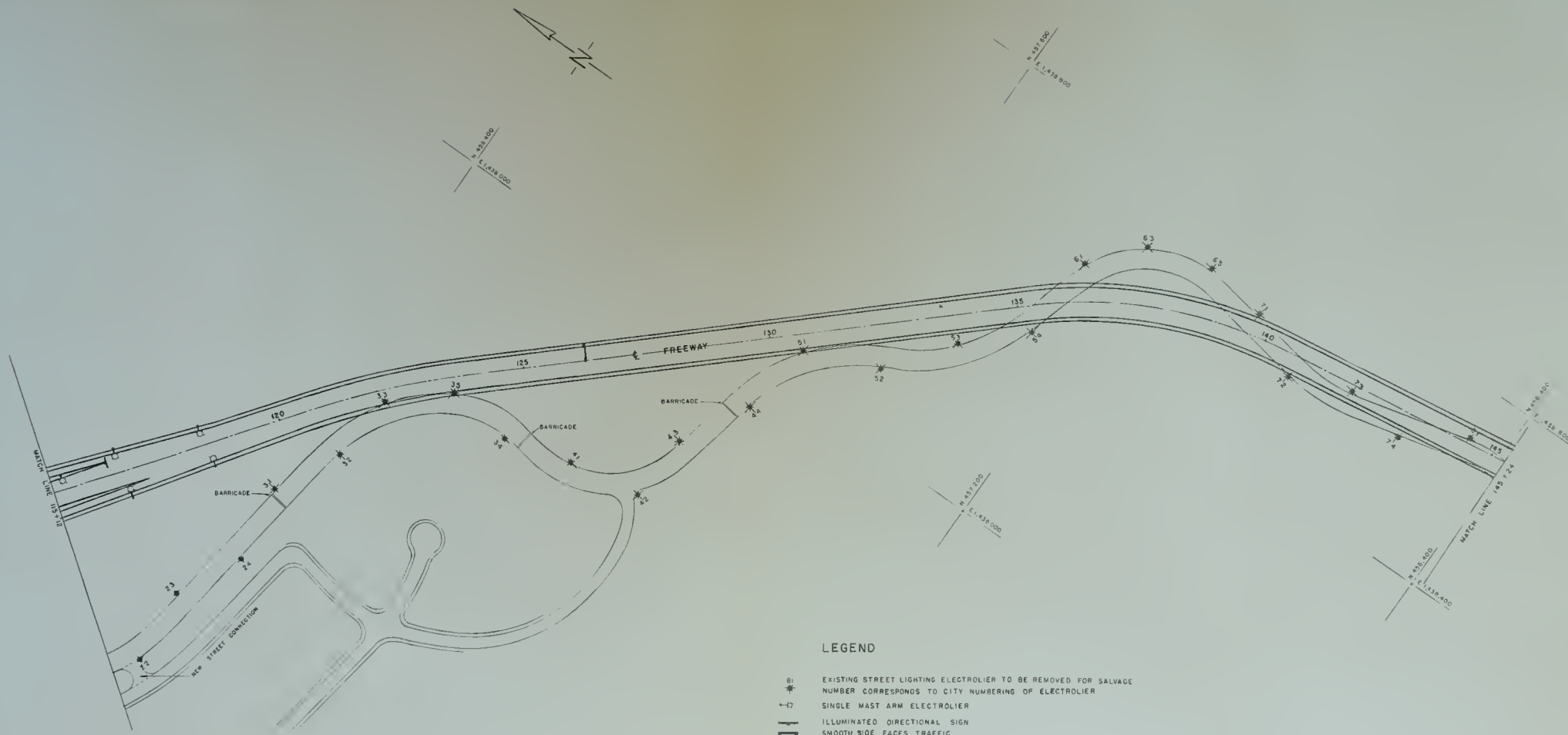
CROSSTOWN FREEWAY

ELECTRICAL PLAN
STATION 85+12 TO STATION 115+12

AUGUST 1957

DWG NO U-18

DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



LEGEND

- 81 EXISTING STREET LIGHTING ELECTROLIER TO BE REMOVED FOR SALVAGE
NUMBER CORRESPONDS TO CITY NUMBERING OF ELECTROLIER
- 51 SINGLE MAST ARM ELECTROLIER
- ILLUMINATED DIRECTIONAL SIGN
- SMOOTH SIDE FACES TRAFFIC

SCALE IN FEET 0 100 200 300

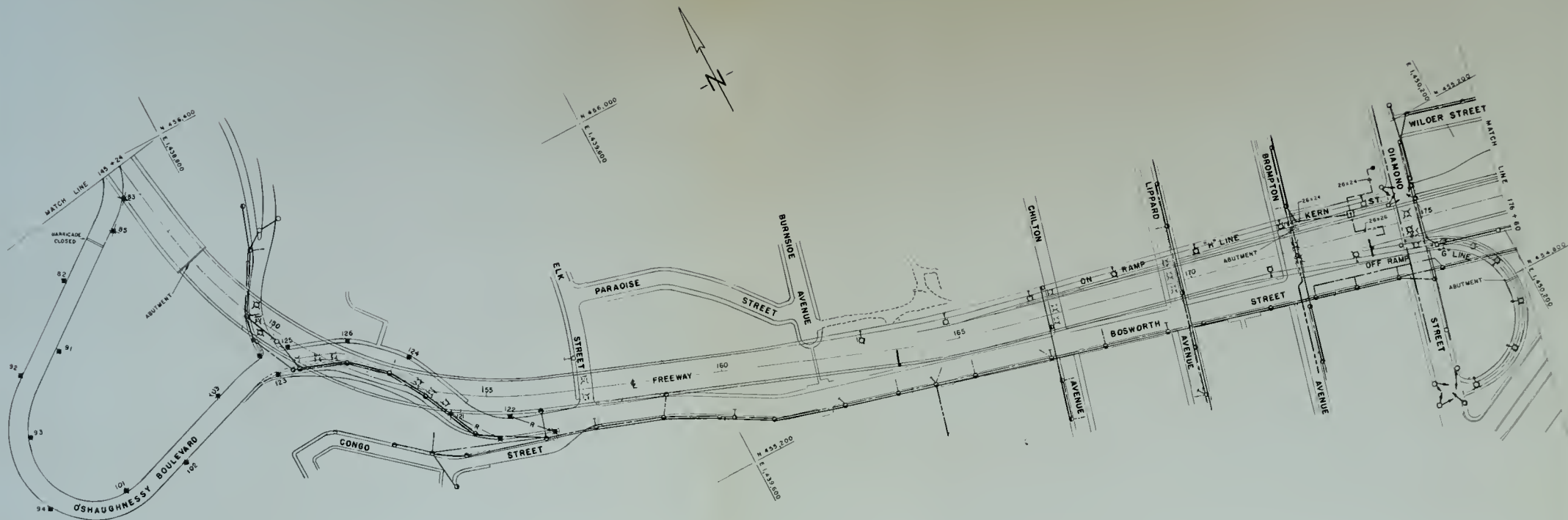
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

CROSTOWN FREEWAY

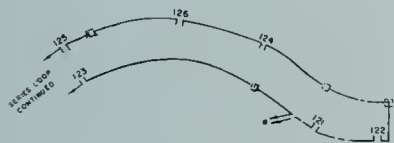
ELECTRICAL PLAN
STATION 115+12 TO STATION 145+24

AUGUST 1957 DWG NO. U-19

DE LEUM CATHY & COMPANY CONSULTING ENGINEERS - SAN FRANCISCO



MODIFICATIONS TO BOSWORTH STREET LIGHTING



WIRING SYMBOLS

- EXISTING SERVICE CONNECTION
- NEW CONDUIT & WIRE (1" B-5KV-1W'G)
- NEW PULLBOX

LEGEND

- 124 ■ EXISTING STREET LIGHTING ELECTROLIER
NUMBER CORRESPONDS TO CITY NUMBERING OF ELECTROLIER
- ★ EXISTING STREET LIGHTING ELECTROLIER
TO BE REMOVED FOR SALVAGE
- R—■ EXISTING STREET LIGHTING ELECTROLIER TO BE REMOVED AND RELOCATED
ARROW POINTS TO RELOCATION
- || UNDER DECK LUMINAIRE FOR FREEWAY OVER STREET
- SINGLE MAST ARM ELECTROLIER
- ||— ILLUMINATED DIRECTIONAL SIGN
- TRAFFIC SIGNAL
ARROWS INDICATE SIGNAL HEADS
- |— TRAFFIC DETECTOR PAD
- EXISTING JOINT PG&E AND PT&T POLE
- EXISTING PG&E POLE
- ||— EXISTING PG&E ELECTRICAL AND PT&T TELEPHONE LINES



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

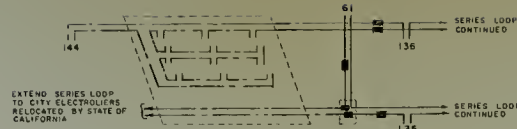
ELECTRICAL PLAN
STATION 145+24 TO STATION 176+60

AUGUST 1957
DE LEUW, CATHART & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

DWG NO U-20

WIRING SYMBOLS & NOTES

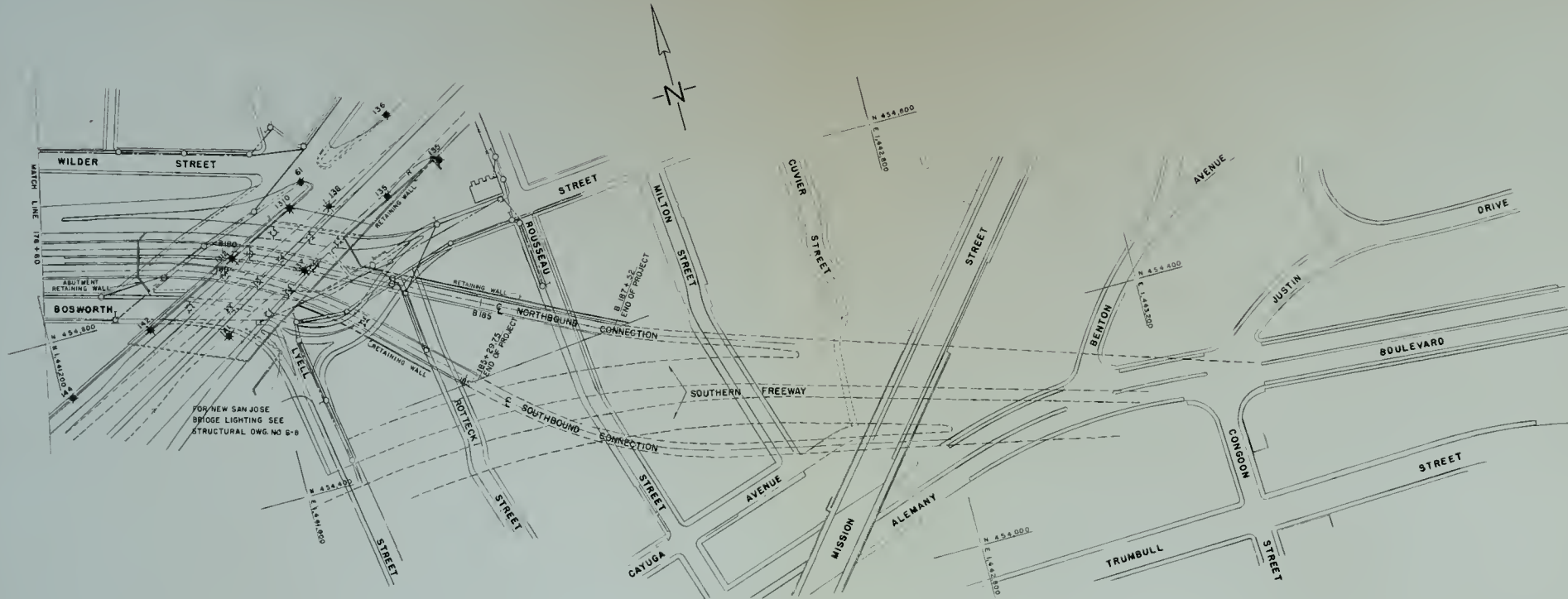
- EXISTING SAN JOSE AVE 66 AMP SERIES LOOP
- SPLICE
- NEW CONDUIT AND WIRE (6-5KV-1 1/2 C)
- • SUPPORT AS REQUIRED UNDER BRIDGE DECK AND PROVIDE EXPANSION COUPLING AS REQUIRED
- EXISTING CONDUIT AND WIRE
- EXISTING PULL BOX



MODIFICATIONS TO SAN JOSE AVENUE
STREET AND BRIDGE LIGHTING

LEGEND

- EXISTING STREET LIGHTING ELECTROLIER NUMBER CORRESPONDS TO CITY NUMBERING OF ELECTROLIER
- R • EXISTING STREET LIGHTING ELECTROLIER TO BE REMOVED AND RELOCATED ARROW POINTS TO RELOCATION
- EXISTING STREET LIGHTING ELECTROLIER TO BE REMOVED FOR SALVAGE
- UNDER DECK LUMINAIRE FOR FREEWAY OVER STREET
- ILLUMINATED DIRECTIONAL SIGN SMOOTH SIDE FACES TRAFFIC
- EXISTING P.O.E. POLE
- EXISTING P.O.E. MANHOLE
- EXISTING P.O.E. ELECTRICAL LINES



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

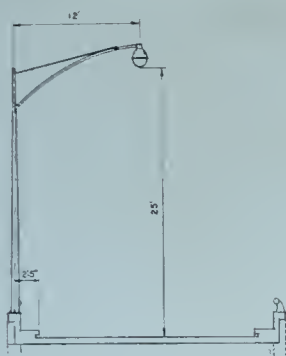
CROSSTOWN FREEWAY

ELECTRICAL PLAN
STATION 176+60 TO STATION 187+52

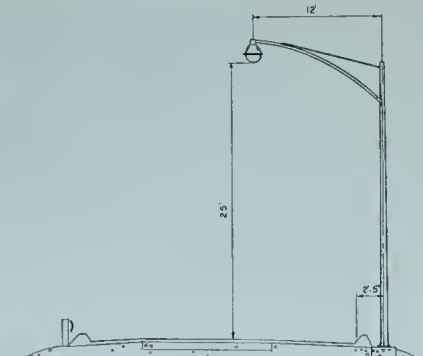
JANUARY 1958

OWG. NO. U-21

DE LEU, CATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

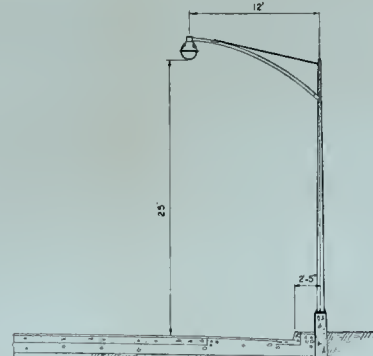


TYPICAL LIGHTING OF RAMP
ON RETAINED FILL

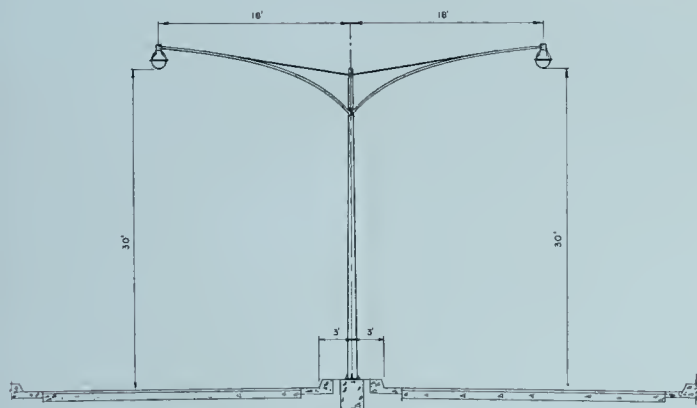


TYPICAL LIGHTING OF RAMP
ON FILL

SCALE IN FEET 0 6 12 18

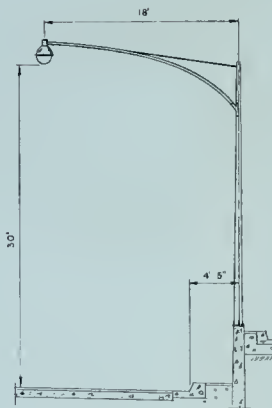


TYPICAL LIGHTING OF RAMP
ON RETAINED CUT

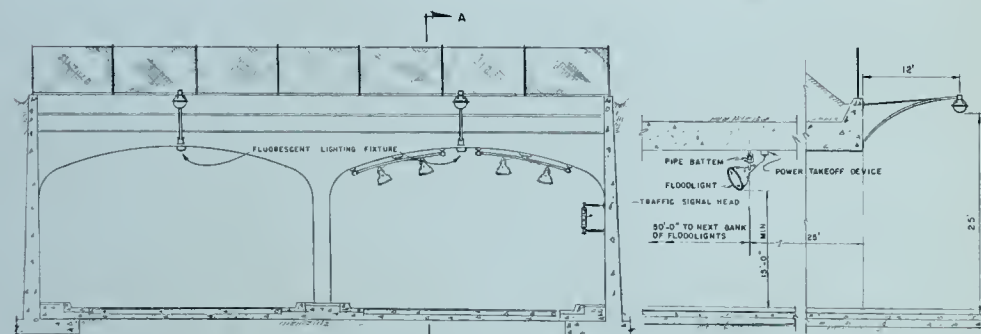


TYPICAL LIGHTING OF FREEWAY AT
APPROACH TO TUNNEL PORTAL

SCALE IN FEET 0 6 12 18

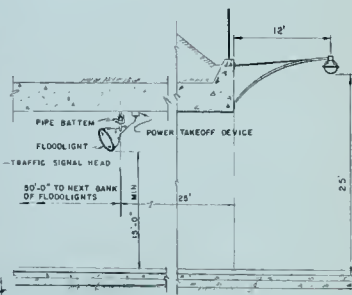


TYPICAL LIGHTING OF FREEWAY
ON RETAINED CUT

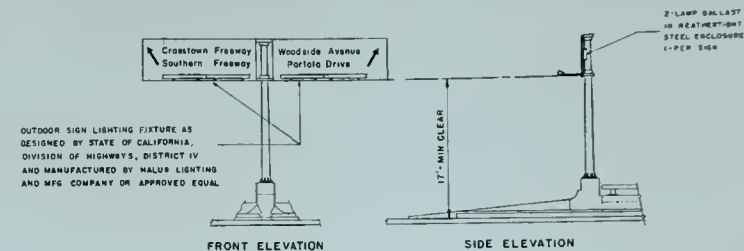


TYPICAL LIGHTING OF FREEWAY
AT TUNNEL PORTAL

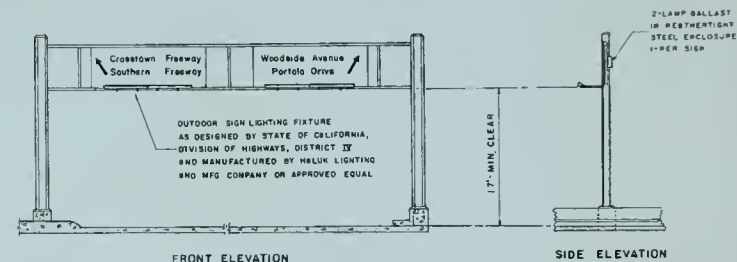
SCALE IN FEET 0 6 12 18



SECTION A-A



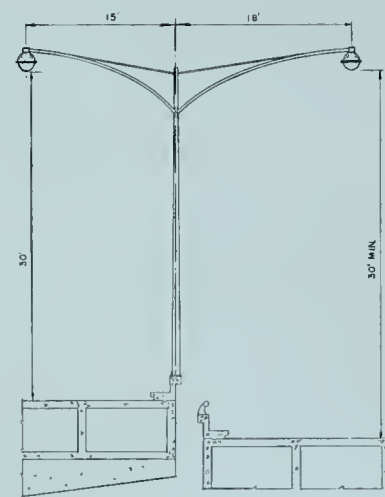
TYPICAL SIGN FRAME & SIGN AT NOSE
WITH SLIMLINE LUMINAIRES



TYPICAL SIGN FRAME & SIGNS WITH SLIMLINE LUMINAIRES
DIRECTIONAL SIGNS ARE BOTTOM ILLUMINATED

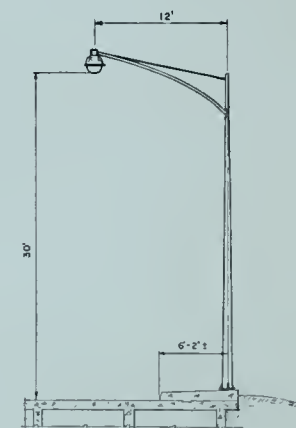
DIRECTIONAL SIGNS - LIGHTING

SCALE IN FEET 0 6 12 18



TYPICAL LIGHTING OF NEW SAN JOSE AVENUE
BRIDGE WITH DOUBLE MAST ARM ELECTROLIER

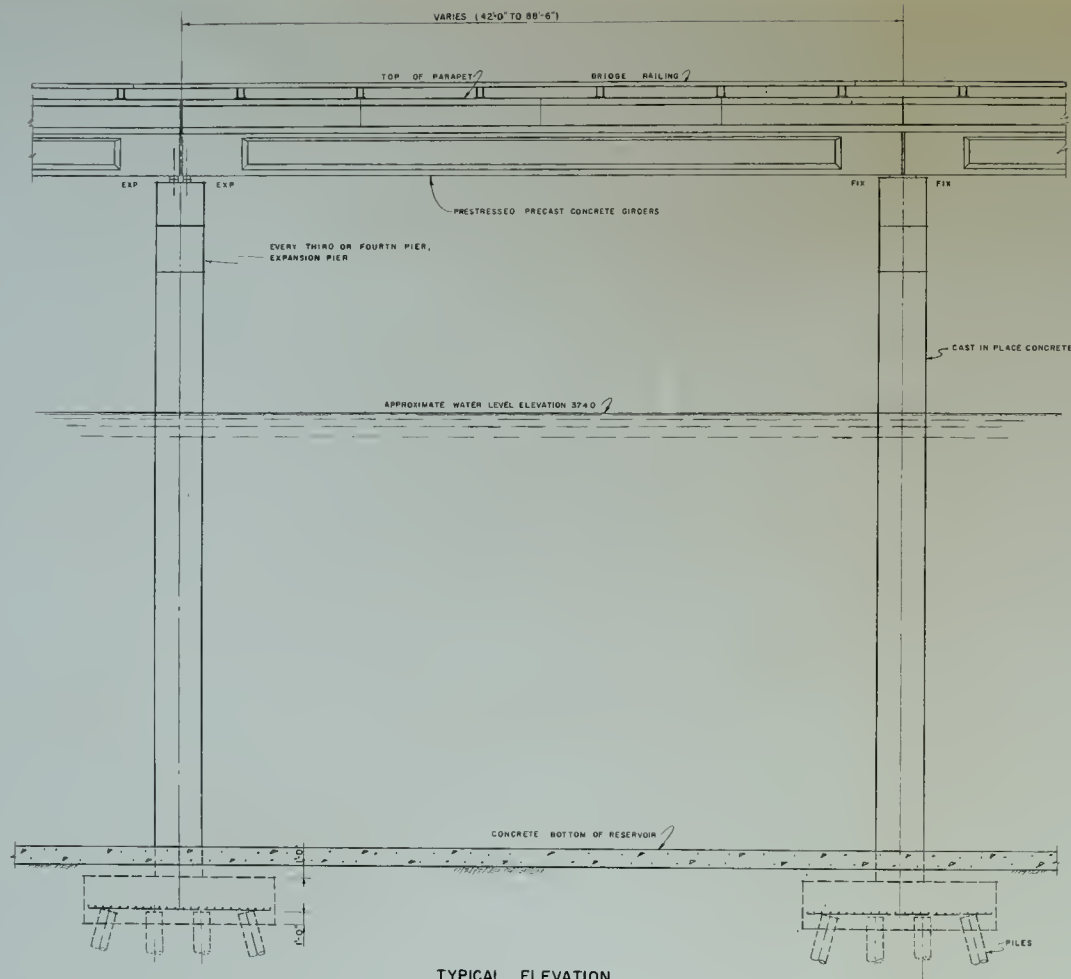
SCALE IN FEET 0 6 12 18



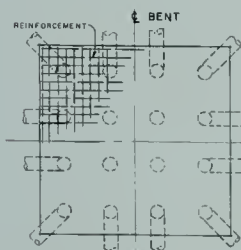
TYPICAL LIGHTING OF NEW SAN JOSE AVENUE
BRIDGE WITH SINGLE MAST ARM ELECTROLIER

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

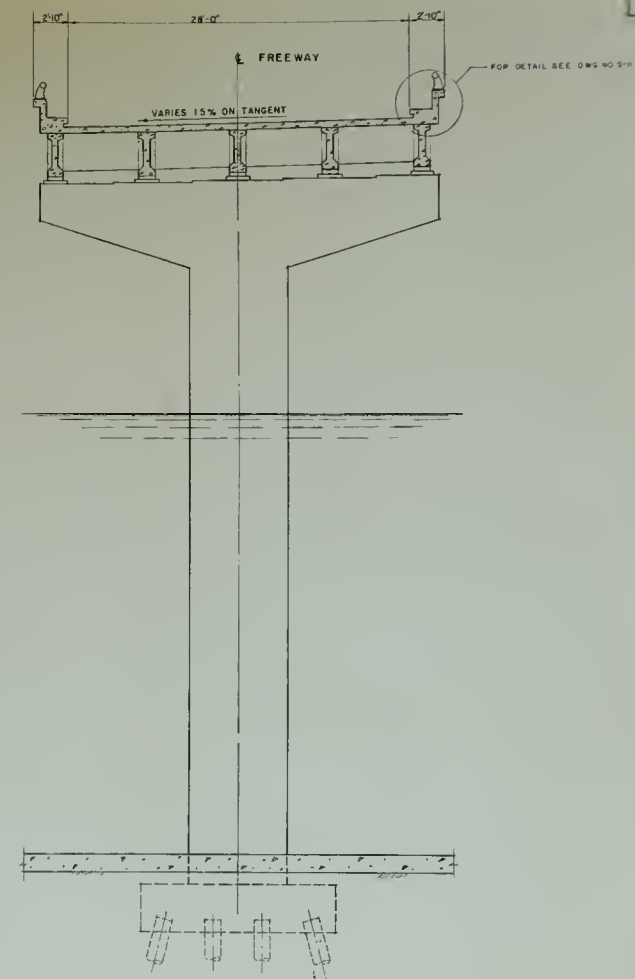
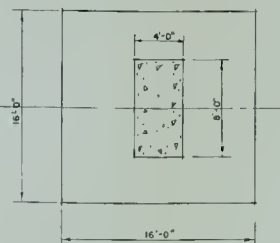
FREEWAY LIGHTING DETAILS



TYPICAL ELEVATION



TYPICAL FOOTINGS



TYPICAL SECTION

NOTES

1. ALL ELEVATIONS REFER TO CITY DATUM
2. MAXIMUM PILE LOAD 45 TONS
3. CONCRETE BENTS TO BE CLASS B CONCRETE
4. PRESTRESSED PRECAST CONCRETE TO HAVE MINIMUM STRENGTH OF 3000 PSI
5. DECK SLAB TO BE CLASS B CONCRETE

SCALE IN FEET



CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

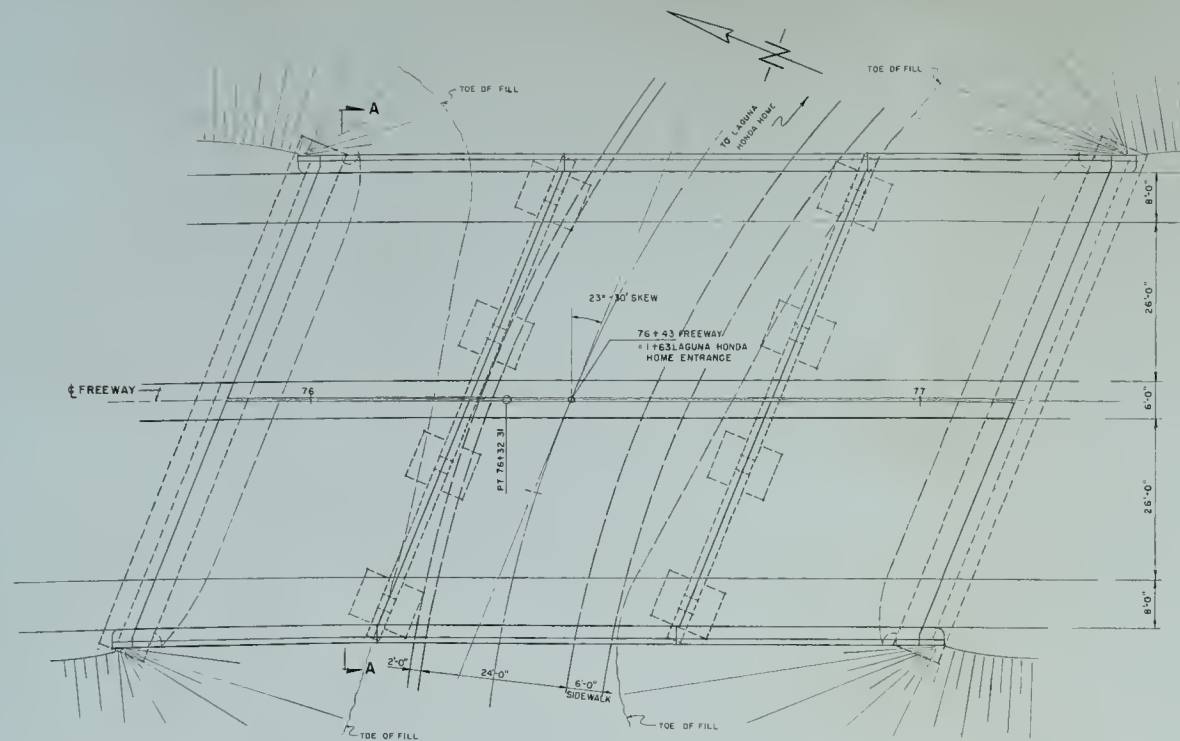
CROSSTOWN FREEWAY

VIADUCT OVER LAGUNA Honda RESERVOIR
TYPICAL SECTION AND ELEVATION

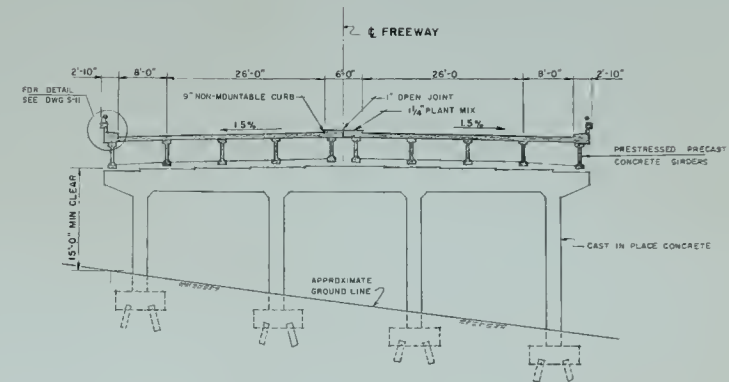
AUGUST 1957

DWG NO 5-1

DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

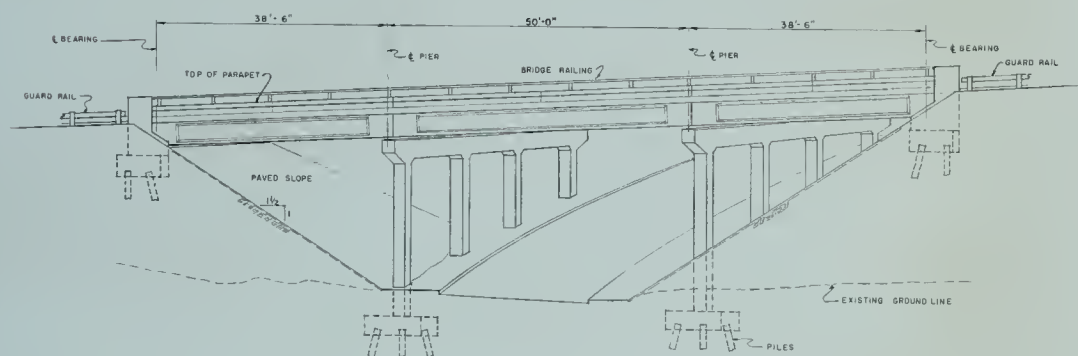


PLAN



SECTION A-A

- NOTES
1. MAXIMUM PILE LOAD 45 TONS
 2. PIERS AND ABUTMENTS TO BE CLASS B CONCRETE
 3. PRESTRESSED PRECAST CONCRETE TO HAVE A MINIMUM STRENGTH OF 5000 PSI
 4. DECK SLAB TO BE CLASS B CONCRETE



ELEVATION

SCALE IN FEET

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

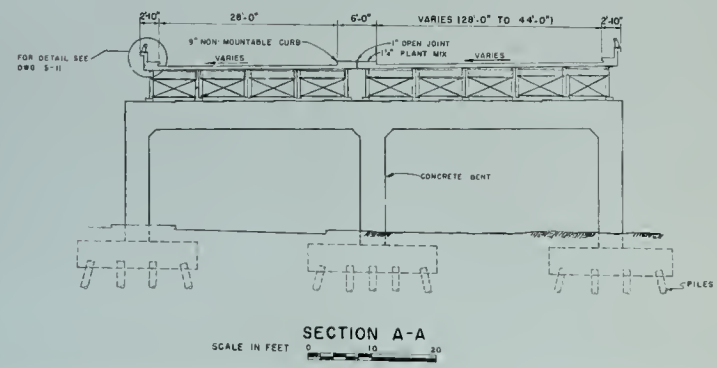
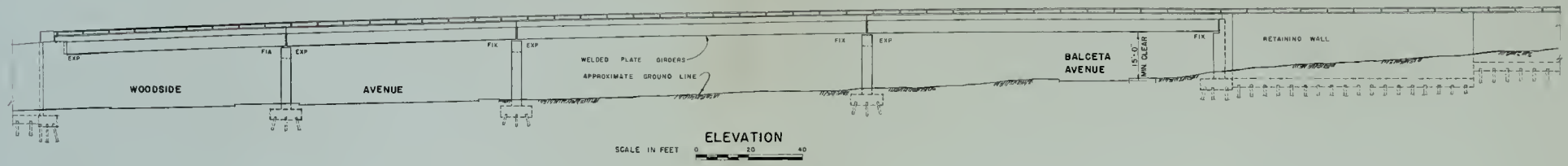
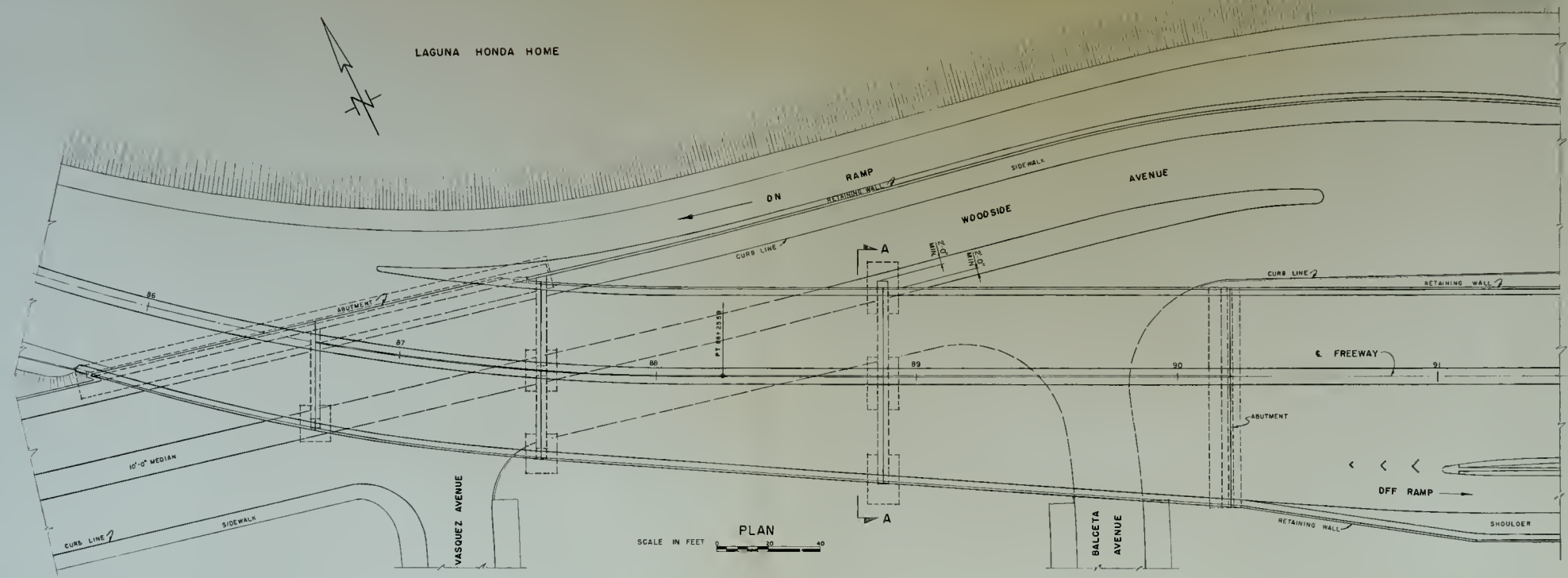
CROSTOWN FREEWAY

BRIDGE OVER ENTRANCE ROAD TO LAGUNA HONDA HOME
PLAN, ELEVATION, AND SECTION

AUGUST 1957

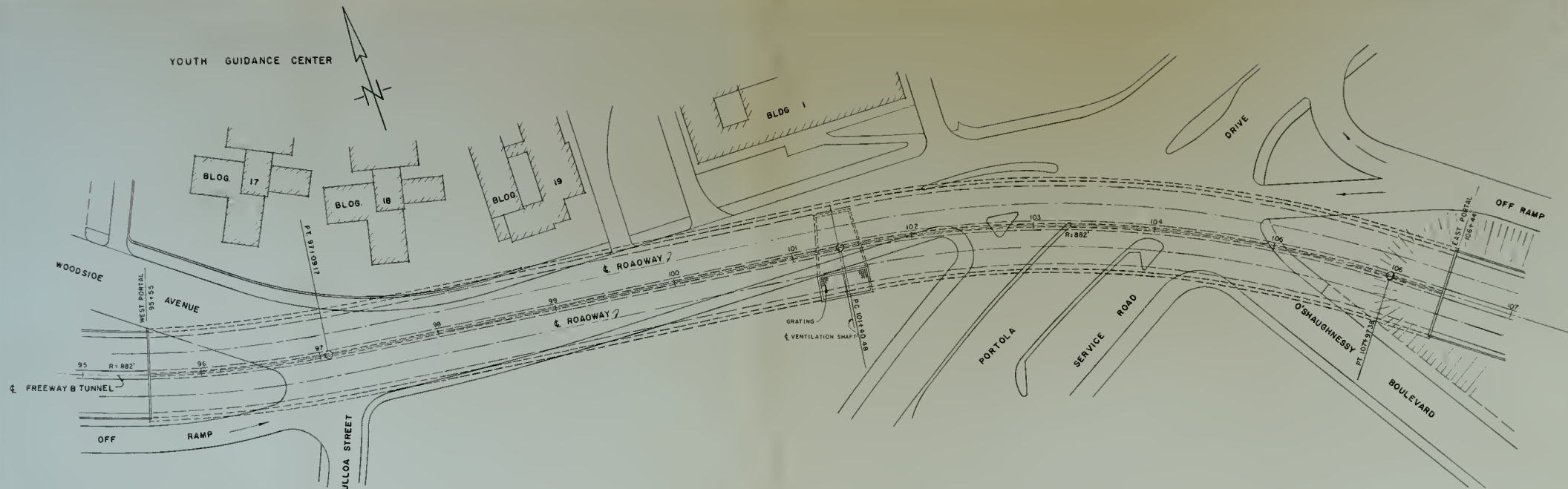
OWG NO S-2

DE LEUW, CATHART & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

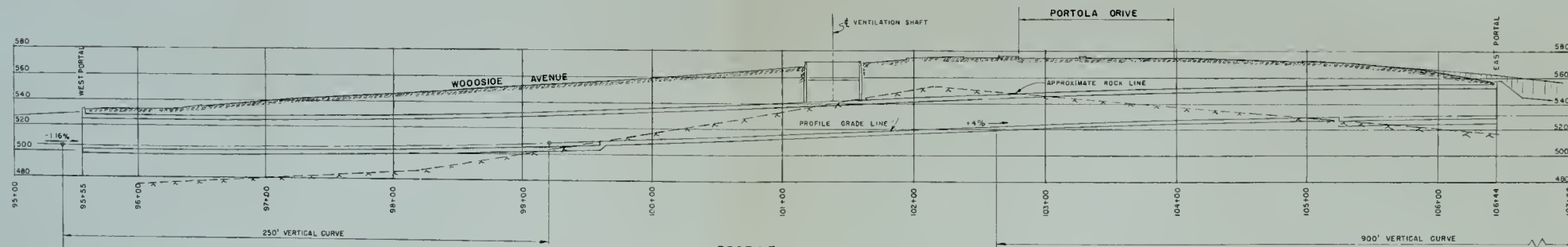


- NOTES
- 1. ALL CONCRETE TO BE CLASS B CONCRETE
 - 2. MAXIMUM PILE LOAD 45 TONS

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
BRIDGE OVER WOODSIDE AVENUE
PLAN, ELEVATION, AND SECTION
AUGUST 1957 DWG. NO. S-3
DE LEUW, CATHY & COMPANY - CONSULTING ENGINEERS SAN FRANCISCO



PLAN



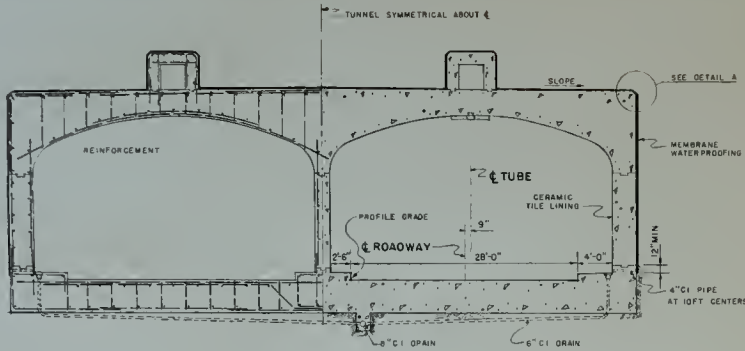
PROFILE

- NOTES
- 1 FOR TYPICAL SECTION SEE DWG S-5
 - 2 ALL ELEVATIONS REFER TO CITY DATUM

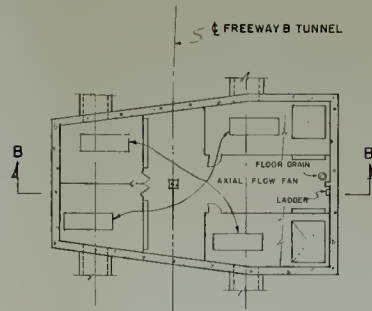
SCALE IN FEET

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
TUNNEL UNDER PORTOLA DRIVE
PLAN AND PROFILE

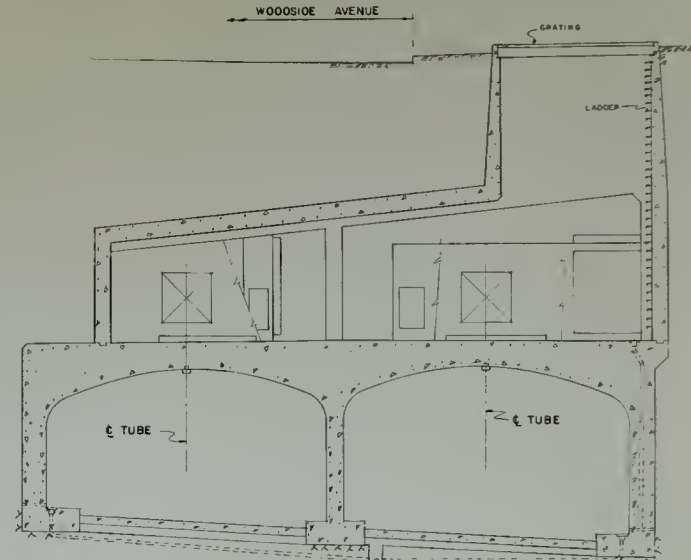
AUGUST 1957 OWS NO. S-4
DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



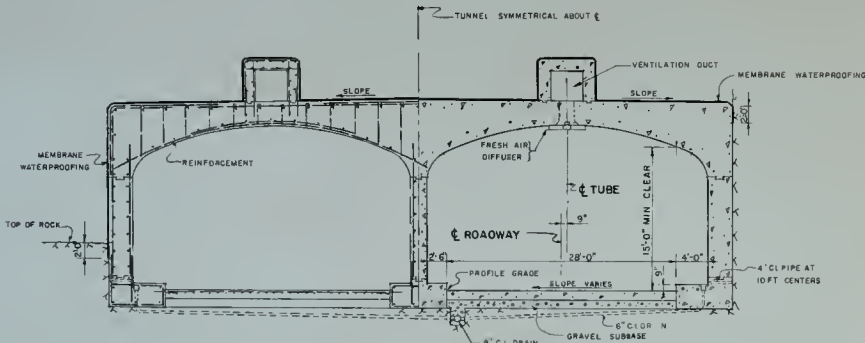
TYPICAL SECTION IN EARTH
SCALE IN FEET 0 5 10 15



PLAN OF FAN ROOM
SCALE IN FEET 0 10 20 30



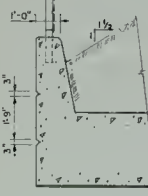
SECTION B-B
SCALE IN FEET 0 5 10 15



TYPICAL SECTION IN ROCK
SCALE IN FEET 0 5 10 15



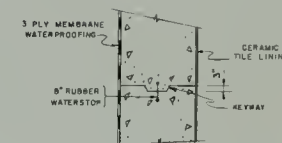
PLAN OF GRATING
SCALE IN FEET 0 10 20 30



SECTION A-A
SCALE IN FEET 0 10 20 30

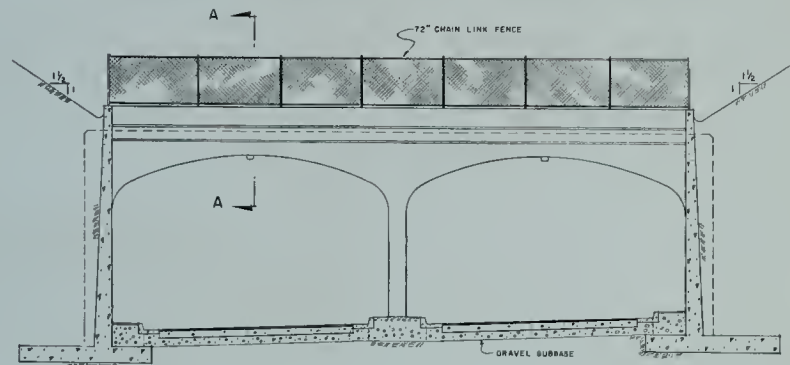


DETAIL A
SCALE IN FEET 0 1 2 3 4 5



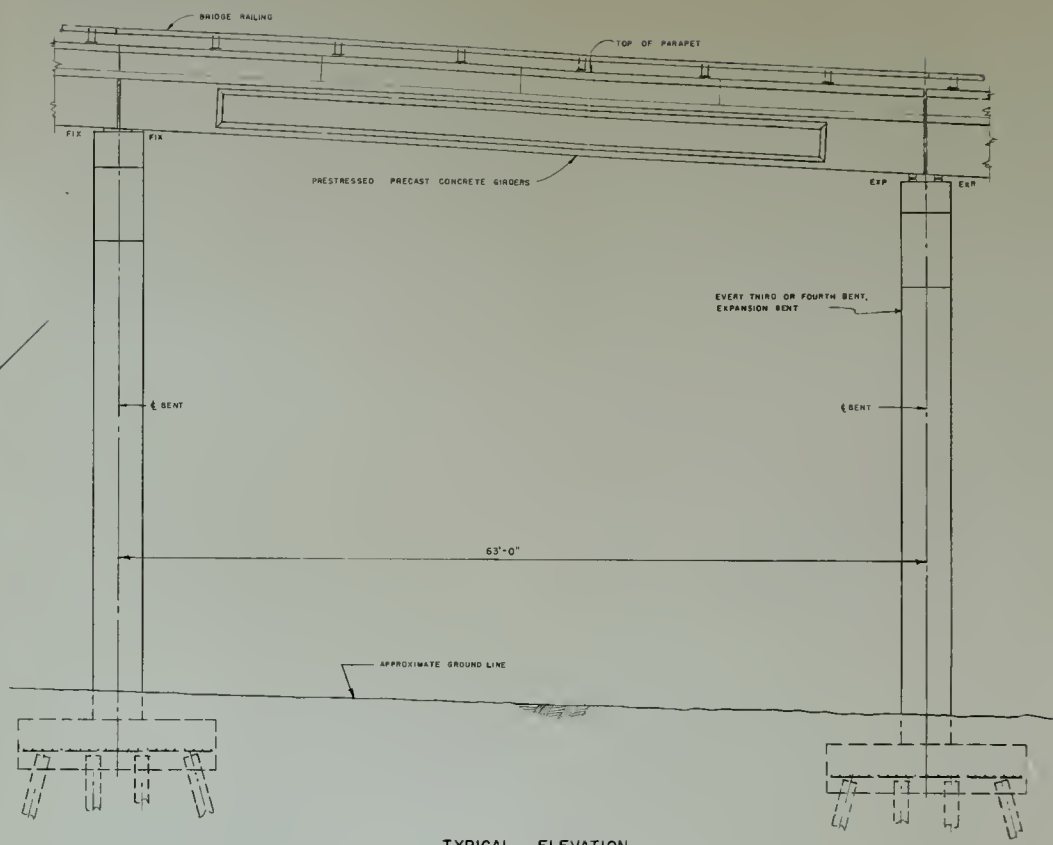
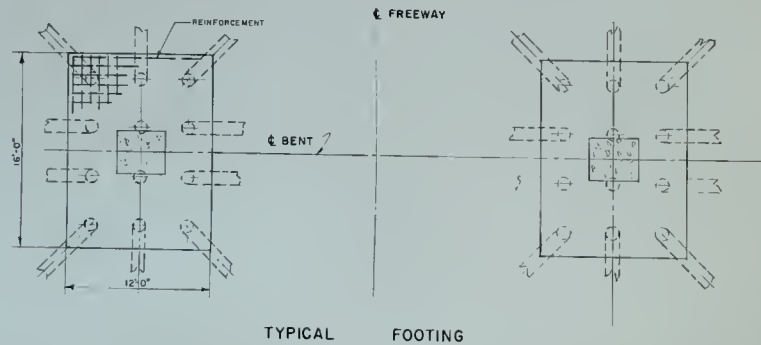
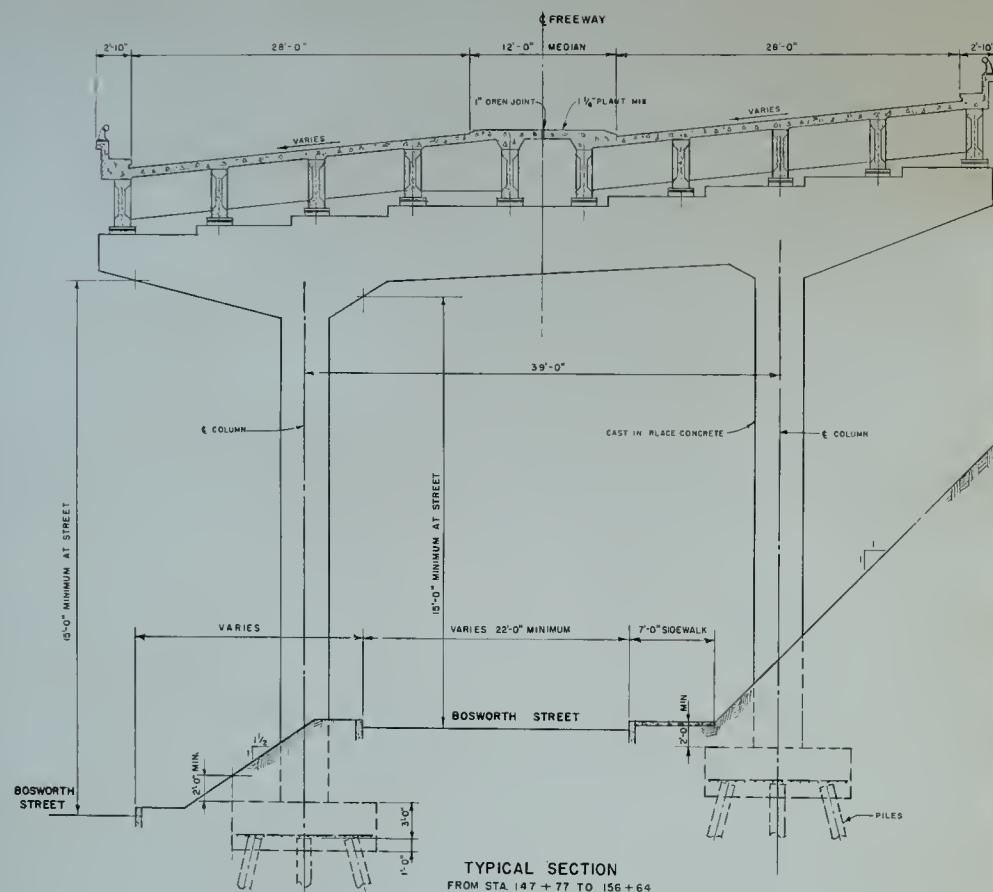
DETAIL OF
EXPANSION JOINT
SCALE IN FEET 0 1 2 3 4 5

- NOTES
1. FOR PLAN AND PROFILE OF TUNNEL SEE DWG S-4
 2. ALL STRUCTURAL CONCRETE TO BE CLASS B CONCRETE



SECTION AT EAST PORTAL
SCALE IN FEET 0 5 10 15

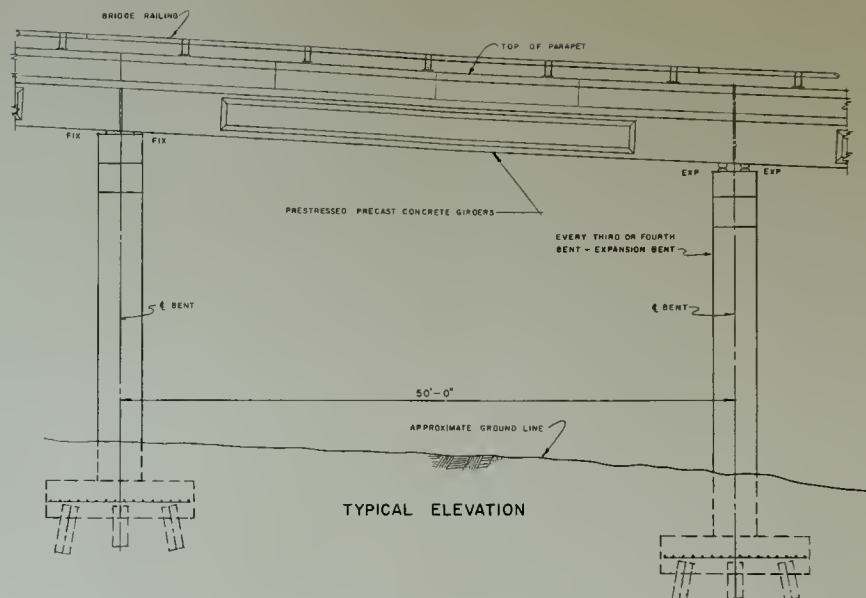
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
TUNNEL UNDER PORTOLA DRIVE
TYPICAL SECTIONS



- NOTES
1. MAXIMUM PILE LOAD 45 TONS
 2. CONCRETE BENTS TO BE CLASS B CONCRETE
 3. PRESTRESSED PRECAST CONCRETE TO HAVE A MINIMUM STRENGTH OF 5000 PSI
 4. DECK SLAB TO BE CLASS B CONCRETE

SCALE IN FEET 0 5 10

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY
BOSWORTH STREET VIADUCT
TYPICAL SECTION AND ELEVATION
CROSSING OF BOSWORTH STREET
AUGUST 1957
OWG NQ 5-6
DE LEUW, CATHAR & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



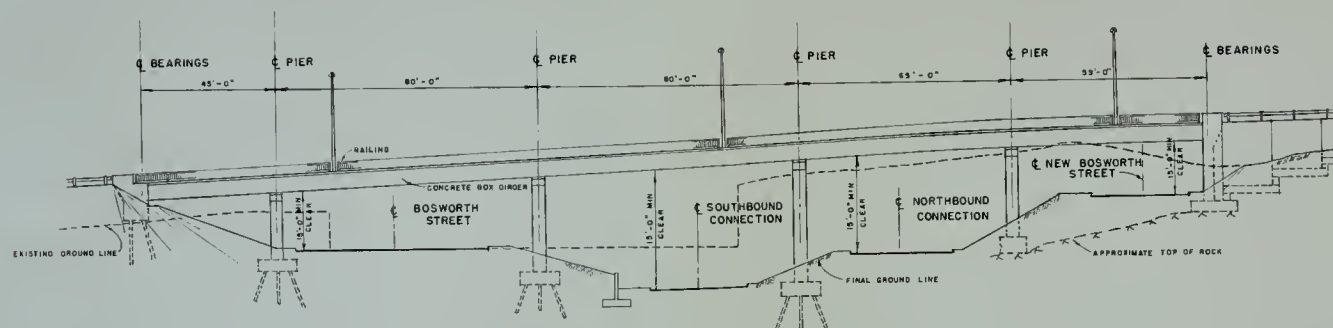
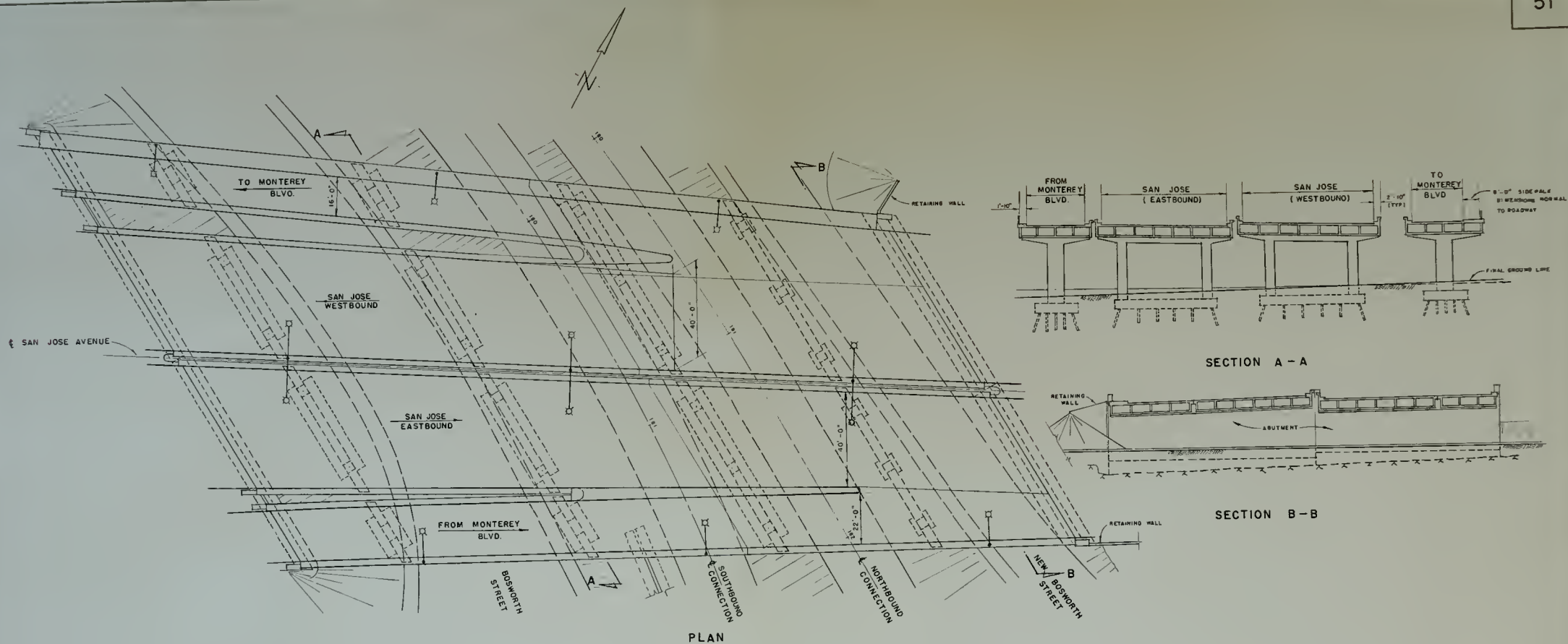
TYPICAL ELEVATION

-

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
BOSWORTH STREET VIADUCT
TYPICAL SECTION AND ELEVATION
THREE COLUMN BENT

TYPICAL FOOTINGS

SCALE IN FEET 0 5 10



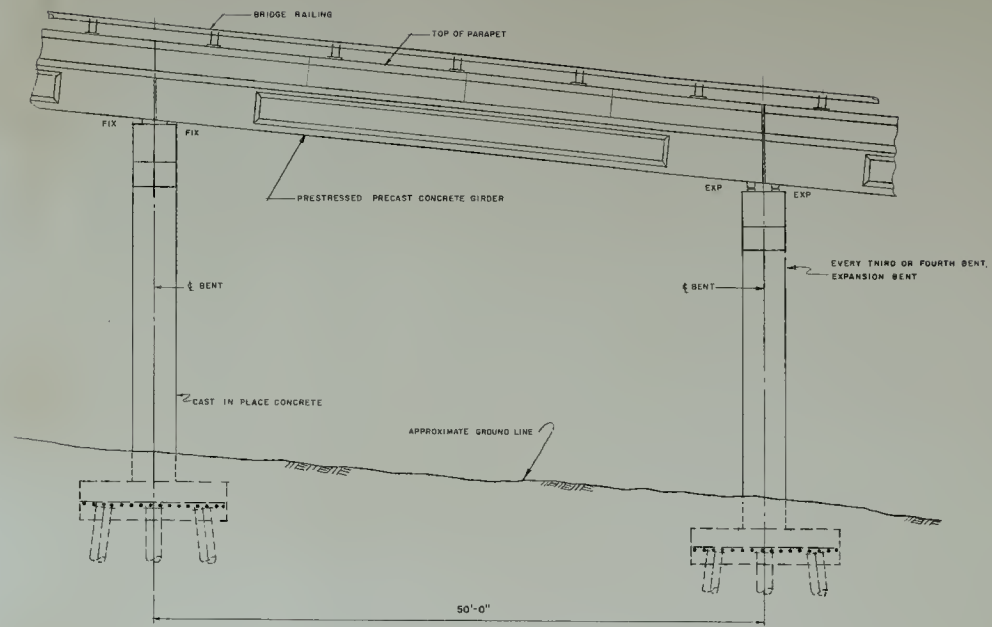
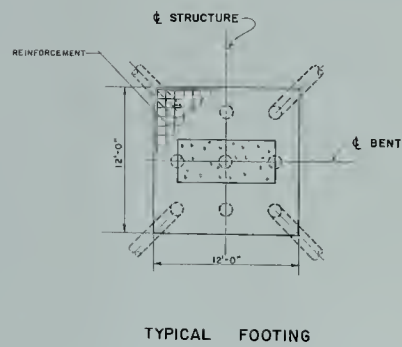
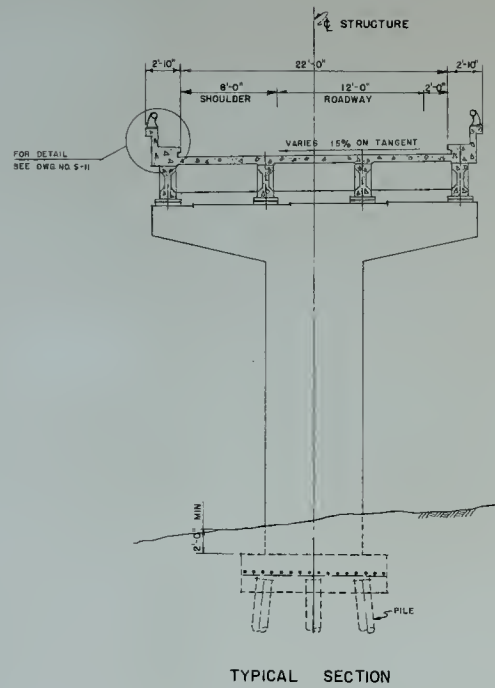
- NOTES:
1. ALL CONCRETE TO BE CLASS 8 CONCRETE EXCEPT AS NOTED
 2. RETAINING WALLS TO BE CLASS 81 CONCRETE
 3. MAXIMUM PILE LOAD 45 TONS

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

SAN JOSE AVENUE BRIDGE OVER FREEWAY
PLAN, ELEVATION, AND SECTIONS

JANUARY 1958 DWG. NO. S-6
DE LEUW, CATHART & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO

SCALE IN FEET 0 20 40



NOTES

1. MAXIMUM PILE LOAD 45 TONS
2. CONCRETE BENTS TO BE CLASS B CONCRETE
3. PRESTRESSED PRECAST CONCRETE TO HAVE A MINIMUM STRENGTH OF 5000 PSI
4. DECK SLAB TO BE CLASS B CONCRETE

SCALE IN FEET

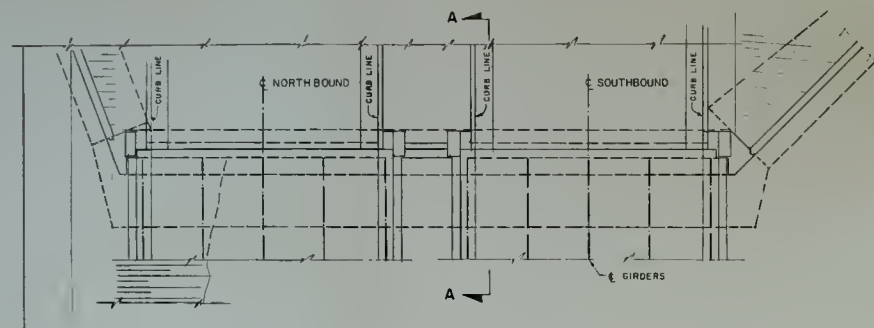
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

RAMP STRUCTURE
TYPICAL SECTION AND ELEVATION

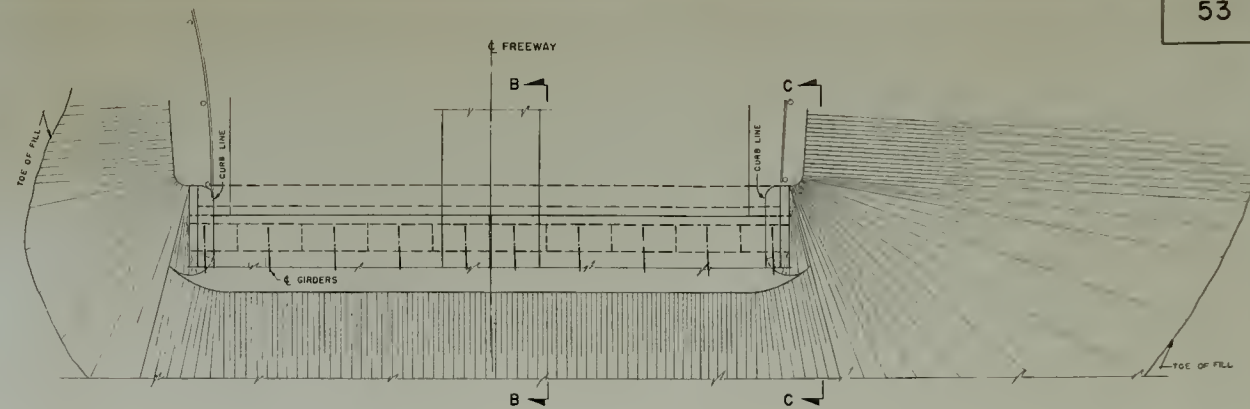
AUGUST 1957

DWG. NO. S-9

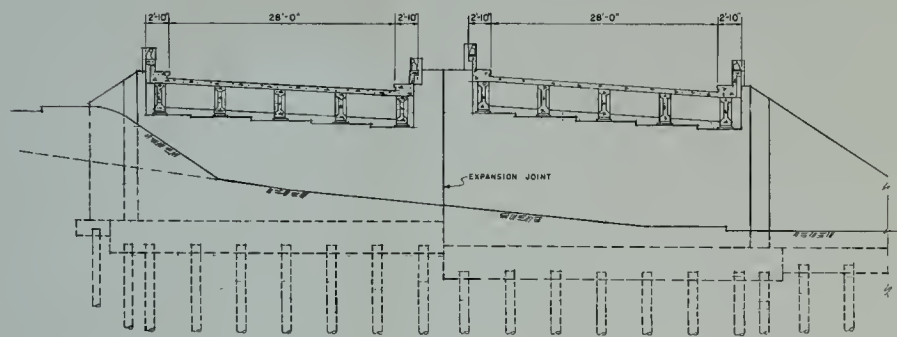
DE LEUW, CATHART & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



PLAN

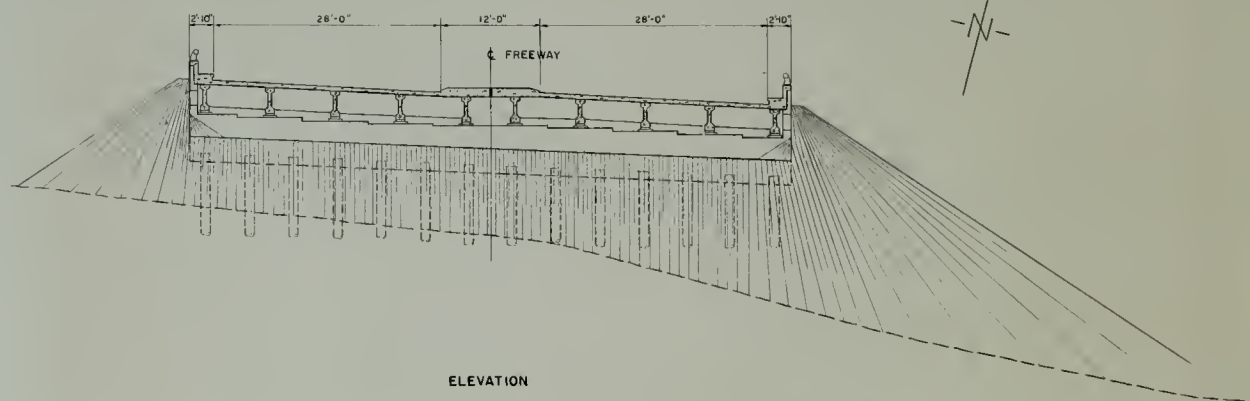


PLAN



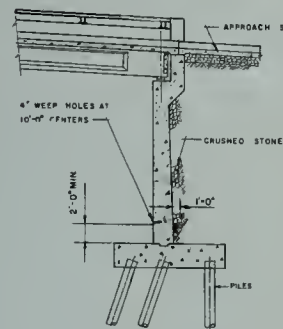
ELEVATION

ABUTMENT AT STATION 178+41

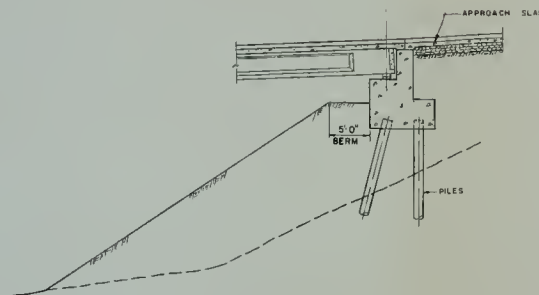


ELEVATION

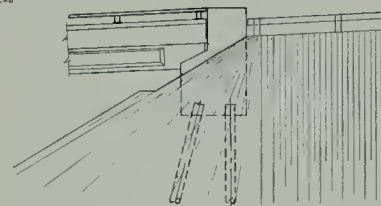
ABUTMENT AT STATION 147+77



SECTION A-A



SECTION B-B



SECTION C-C

NOTES
 1. ABUTMENTS TO BE CLASS B CONCRETE
 2. MAXIMUM PILE LOAD 45 TONS

SCALE IN FEET 0 10 20

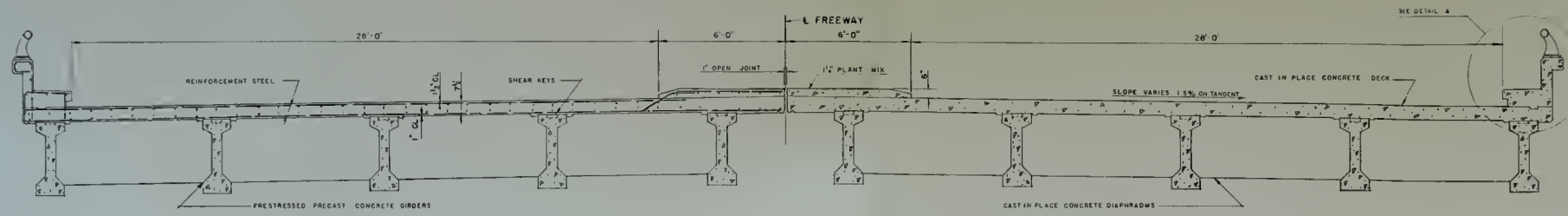
CITY AND COUNTY OF SAN FRANCISCO
 DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

ABUTMENTS
 PLANS, ELEVATIONS, AND SECTIONS

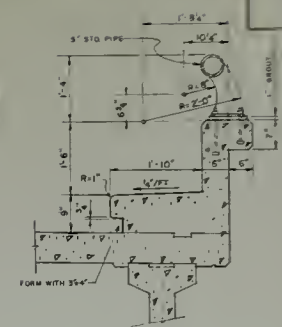
AUGUST 1957

DWG. NO. S-10

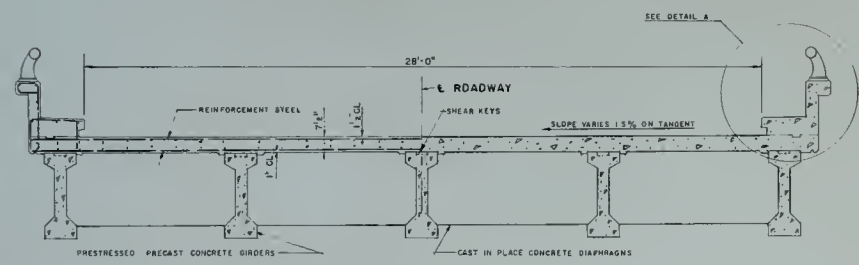
DE LEUW, CATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



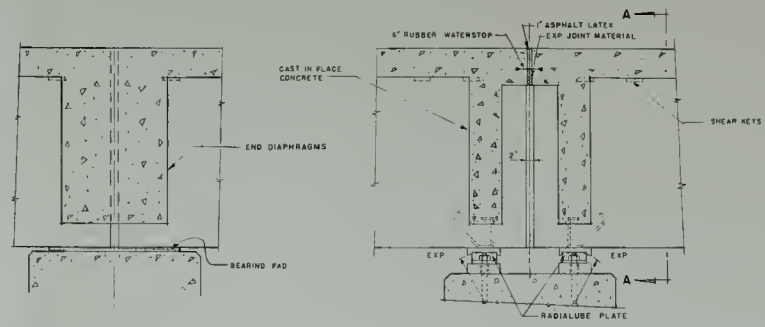
TYPICAL SECTION BOSWORTH STREET VIADUCT
SCALE IN FEET 0 1 2 3 4



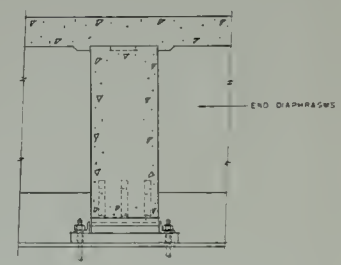
DETAIL A
SCALE IN FEET 0 1 2



TYPICAL SECTION VIADUCT OVER LAGUNA HONDA RESERVOIR
SCALE IN FEET 0 1 2 3 4

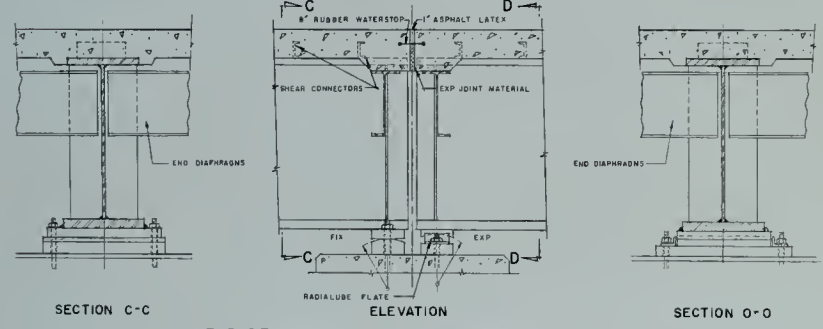


ELEVATION AT FIXED BENT ELEVATION AT EXPANSION BENT

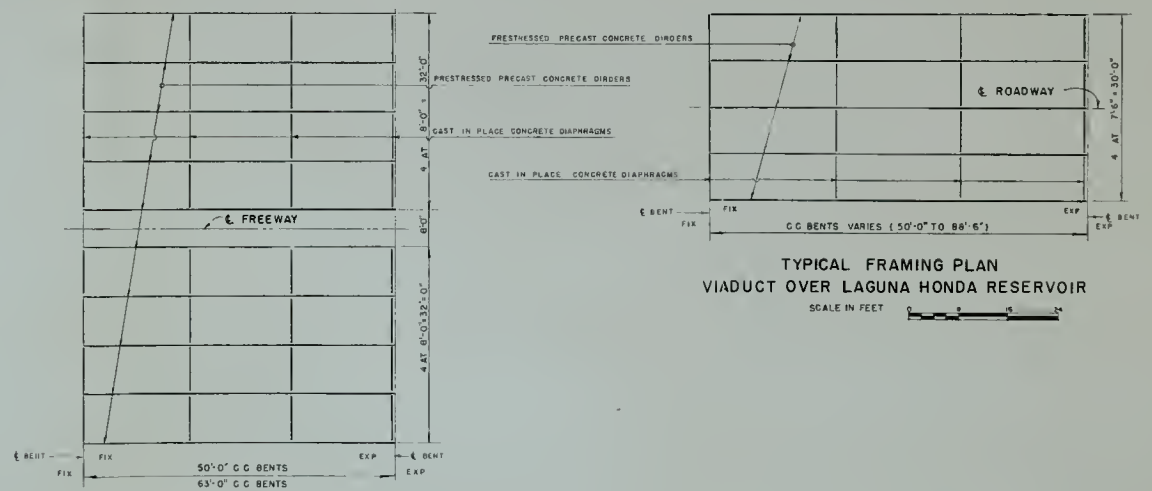


SECTION A-A

END BEARING DETAILS FOR PRESTRESSED CONCRETE GIRDERS
SCALE IN FEET 0 1 2 3 4

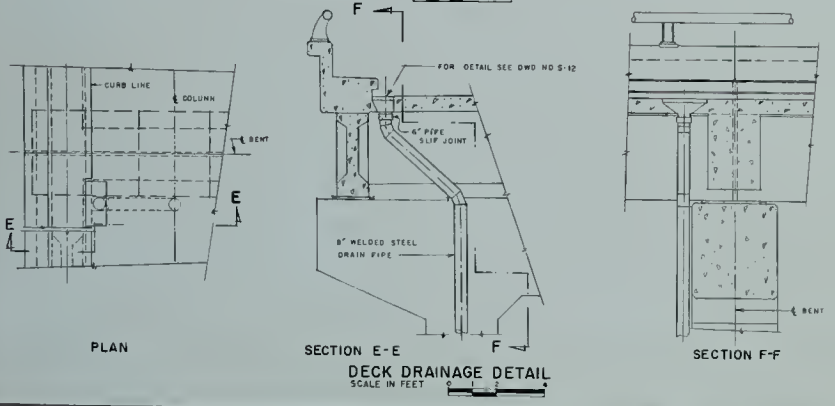


END BEARING DETAILS FOR STEEL GIRDERS
SCALE IN FEET 0 1 2 3 4



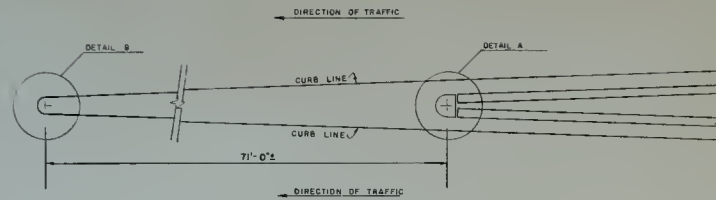
TYPICAL FRAMING PLAN
BOSWORTH STREET VIADUCT
SCALE IN FEET 0 1 2 3 4

TYPICAL FRAMING PLAN
VIADUCT OVER LAGUNA HONDA RESERVOIR
SCALE IN FEET 0 1 2 3 4



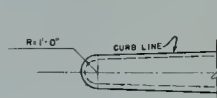
SECTION E-E
DECK DRAINAGE DETAIL
SCALE IN FEET 0 1 2 3 4

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY
SUPERSTRUCTURE DETAILS

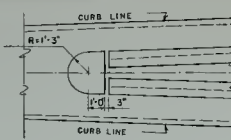


PLAN OF SEPARATOR ISLAND FOR MERGING TRAFFIC

SCALE IN FEET 0 10 20



PLAN



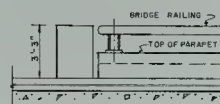
PLAN



ELEVATION

DETAIL B

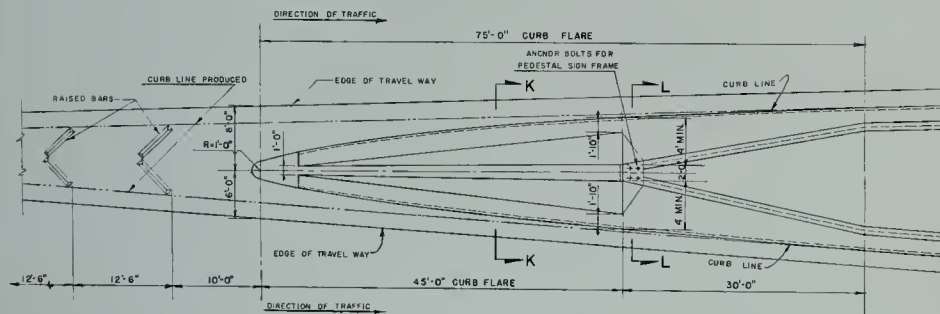
SCALE IN FEET 0 5 10



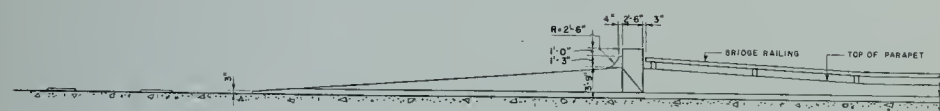
ELEVATION

DETAIL A

SCALE IN FEET 0 5 10



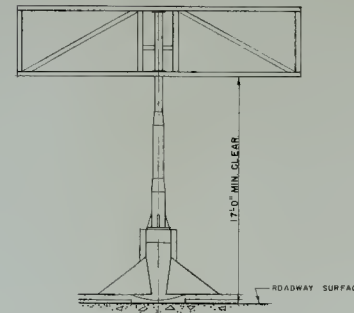
PLAN



ELEVATION

ISLAND NOSE FOR DIVERGING TRAFFIC

SCALE IN FEET 0 5 10

PEDESTAL TYPE FRAME
FOR ROADWAY SIGNS

SCALE IN FEET 0 5 10



DETAIL J

SCALE IN FEET 0 5 10

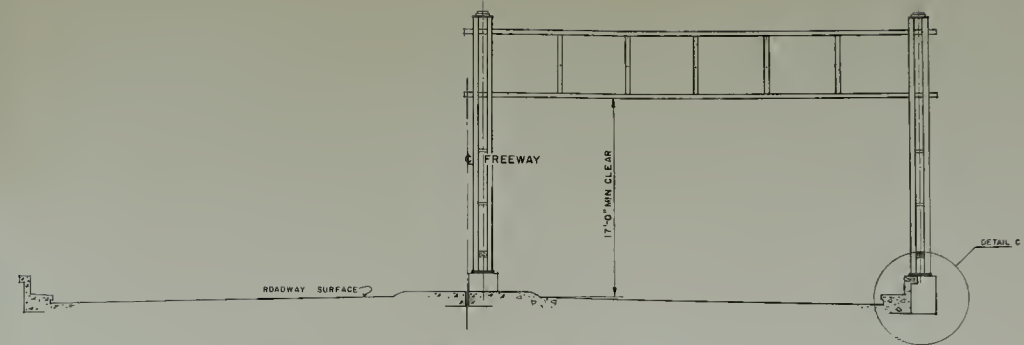


SECTION L-L

SCALE IN FEET 0 5 10

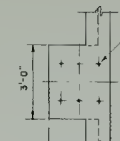


SECTION K-K

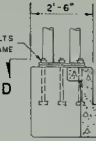


BRIDGE TYPE FRAME FOR ROADWAY SIGNS

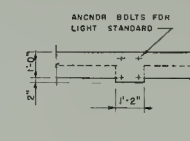
SCALE IN FEET 0 5 10



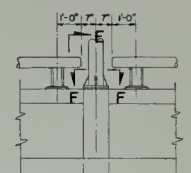
PLAN O-D



DETAIL C



PLAN F-F



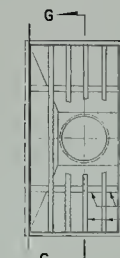
ELEVATION



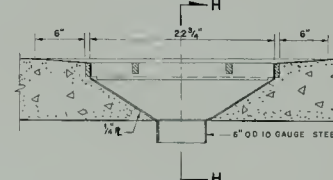
SECTION E-E

BRIDGE SIGN BASE

SCALE IN FEET 0 2 4



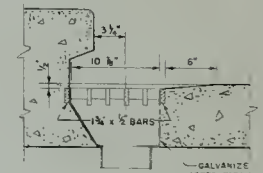
PLAN



SECTION G-G

LIGHT STANDARD BASE DETAILS

SCALE IN FEET 0 2 4



SECTION H-H

DECK DRAIN DETAILS

SCALE IN FEET 0 1 2

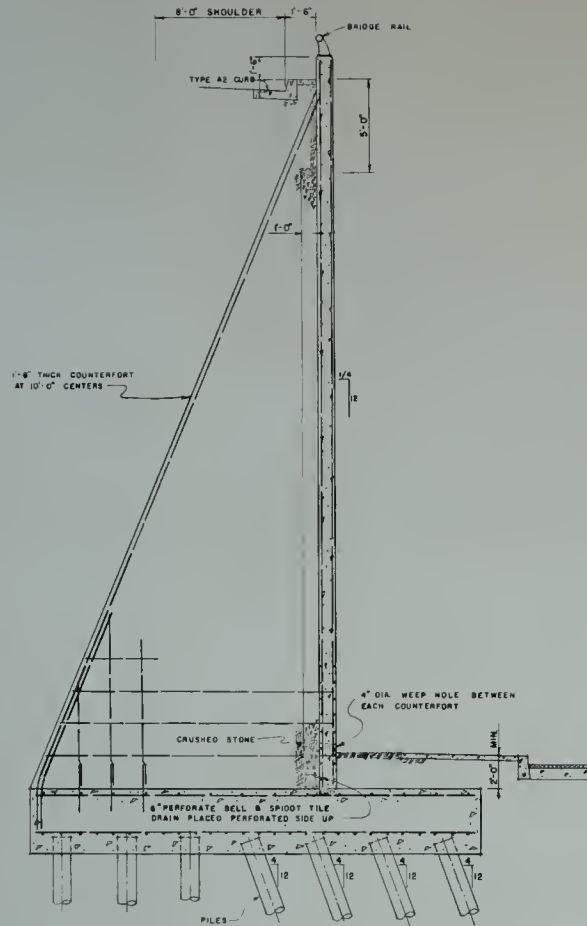
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSSTOWN FREEWAY

MISCELLANEOUS STRUCTURAL DETAILS

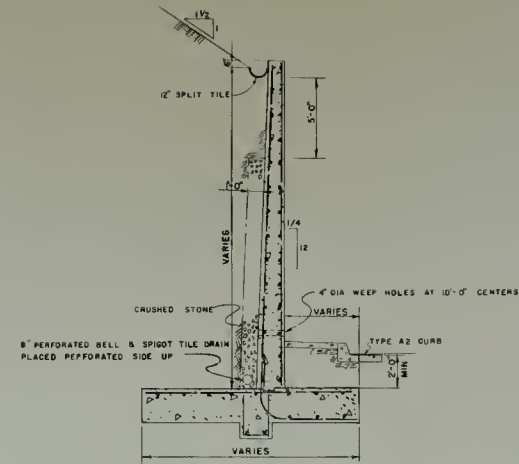
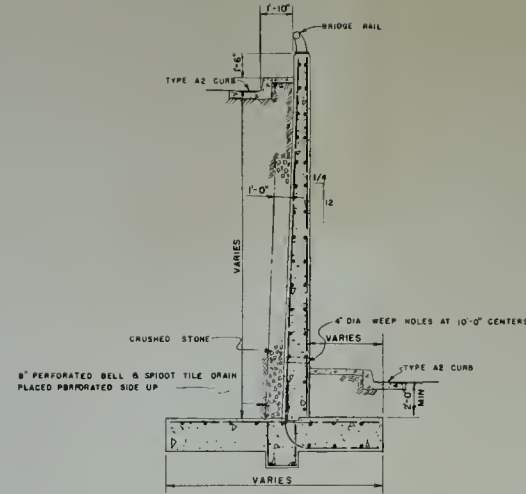
AUGUST 1957

DWG. NO. S-12

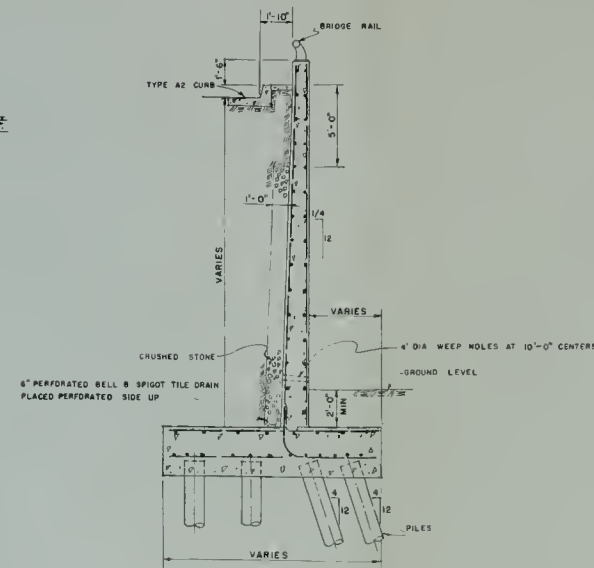
DE LEUW, GATNER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



COUNTERFORTED RETAINING WALL



CANTILEVER RETAINING WALLS WITH SPREAD FOOTINGS

CANTILEVER RETAINING WALL
WITH PILE FOOTING

SCALE IN FEET



NOTES

1. COUNTERFORT RETAINING WALL TO BE CLASS B CONCRETE
2. CANTILEVER RETAINING WALL TO BE CLASS B-1 CONCRETE
3. MAXIMUM PILE LOAD 45 TONS
4. WALLS WITH SPREAD FOOTINGS TO HAVE KEYS AND TOE OF FOOTINGS PLACED AGAINST UNDISTURBED EARTH

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

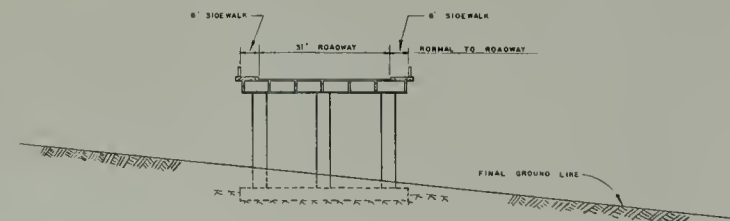
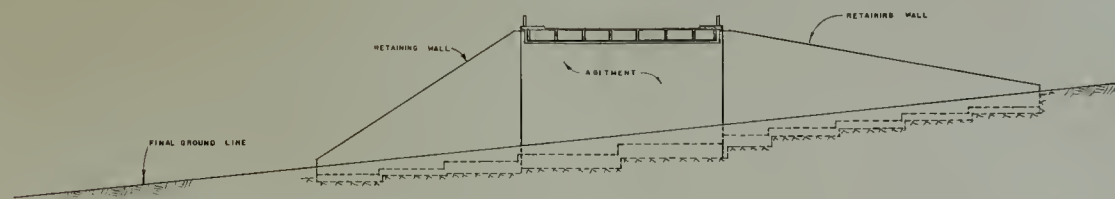
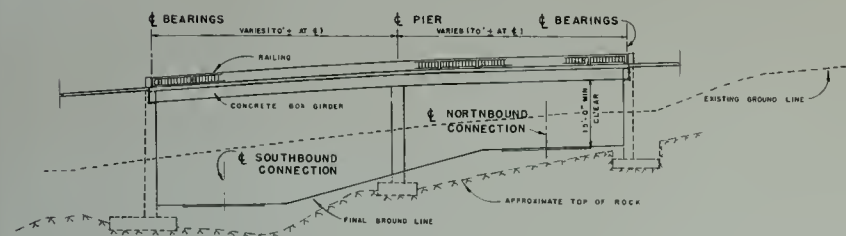
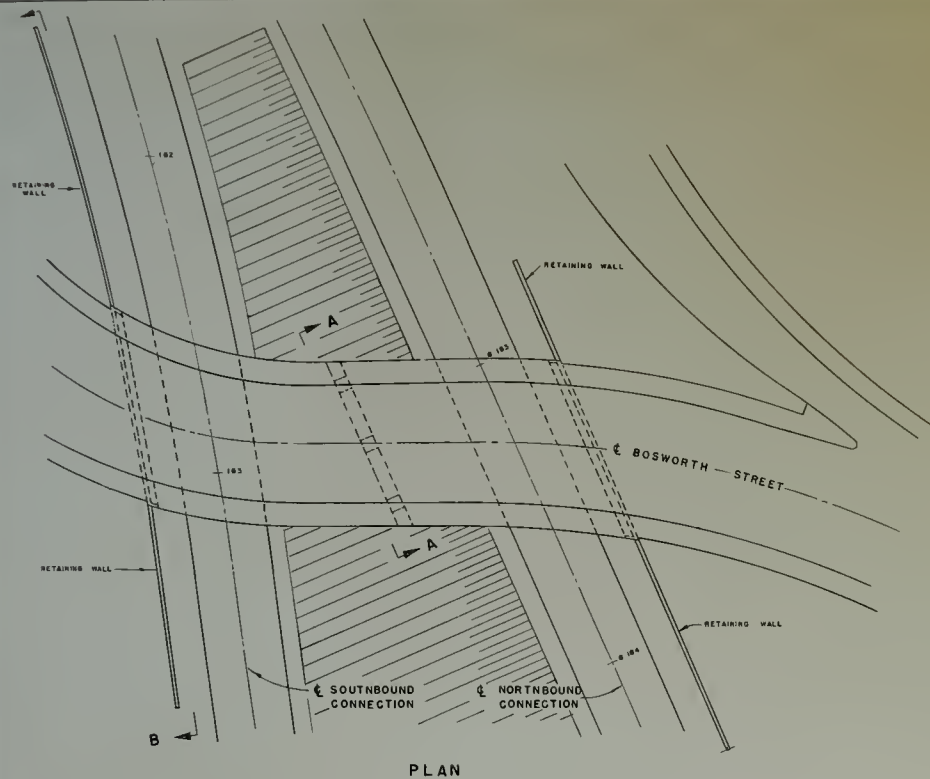
CROSSTOWN FREEWAY

RETAINING WALLS
TYPICAL SECTIONS

AUGUST 1937

DWG NO S-13

DE LEUW, CATHER & COMPANY - CONSULTING ENGINEERS - SAN FRANCISCO



NOTE:

- 1 ALL CONCRETE TO BE CLASS B CONCRETE EXCEPT AS NOTED.
- 2 RETAINING WALLS TO BE CLASS B1 CONCRETE

SCALE IN FEET

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
CROSTOWN FREEWAY

NEW BOSWORTH STREET BRIDGE OVER FREEWAY
PLAN, ELEVATION, AND SECTIONS

JANUARY 1958

DWG NO. S-14

DE LEUW, CATHAR & COMPANY CONSULTING ENGINEERS - SAN FRANCISCO

